

# GLOBAL PARTNERSHIPS

- Introduction
- Defining Global Partnerships
- Development Process
- End State
- Assumptions for Achieving Global Partnerships
- Key Concepts for Partnering
- Roadmaps for Partnerships
- Assessing Priorities for Global Partnerships
- Making Global Partnerships Real
- Achieving Early Success in Partnering

**Global Partnerships is a concept for leveraging domestic and international resources from the military, civil, commercial, intelligence, and national communities to strengthen the DoD's space capabilities. Additionally, these efforts will enhance confidence in coalition warfare through closer cooperation with our allies in space.**

## INTRODUCTION

"Government and commercial partnerships in a new operations paradigm may provide lowered cost for programs and new opportunities for industry. Partnerships will be required on a global scale never before achieved in order to set the scientific goals, surmount the technical problems and share the financial burden."

*John W. O'Neill*

*Director, Mission Operations Directorate  
Johnson Space Center*

The Global Partnerships (GP) operational concept strengthens military space capabilities through leveraging civil, commercial, non-US intelligence, national, and international space systems. The growth of military space systems in other countries provides the opportunity for the United States to gain increased battlespace awareness and information connectivity at lower cost. Partnerships

provide more opportunity to share cost and risks. Partnering starts at home, but international relationships may present unique opportunities when we become most concerned about coalition warfare.

This operational concept assumes three enduring trends:

- Military warfighting requirements that exceed constrained military budgets in the out-years
- Dramatic growth in space-based capabilities among the civil, commercial, intelligence, and national communities
- Growth in multi-national operations and alliances

Historical lines defining requirements for space communities are being redrawn. As new economic, political, and technological forces emerge, USSPACECOM has the unique opportunity to capitalize on and affect this changing environment. Global Partnerships sets aside past paradigms, thinks "outside the box," and explores avenues USSPACECOM should consider to employ space forces well into the next millennium.

## DEFINING GLOBAL PARTNERSHIPS

Global Partnerships are key to USSPACECOM's Vision for 2020. Sharing the burden among allied spacefaring nations for services of common interest may help solve budgeting problems in the out-years. Partnering is a way to decrease pressure on military infrastructure by adding to the DoD's resources, so we can reinvest savings to get the needed capabilities by 2020. Partnerships may also help reach 2020 goals earlier by eliminating military specific requirements or satisfying them with nonmaterial solutions.

Partnering doesn't mean reduced vigilance for defense in and through space. It's not a goal in itself, nor is it a naive attempt to provide peace and harmony by trading away our sophisticated technologies. Instead, it recognizes what the United States can gain by adding to our prowess in space

and is a pragmatic attempt to bolster our war-fighting abilities and deterrence despite increasing worldwide competition. In the years leading to 2020, partnering will also strengthen alliances and build confidence in coalition warfighting—envisioned by most defense analysts as increasingly necessary and common for conflict resolution. Our partnering philosophy tries to build enduring relationships of mutual interest by reducing unilateral national requirements or satisfying them without spending more money. The main goals that guided development of the GP plan are listed below.

- Identify opportunities to augment the US military's space capabilities through partnerships that leverage space resources from the foreign and domestic military, civil, commercial, and intelligence communities.
- Decrease pressure on US existing and future military infrastructure, while maintaining flexibility.
- Build enduring relationships based on common interest by combining proven partnering tools (organize, cooperate, develop policies, standards, etc.) in innovative ways to mutual advantage.
- Build confidence in our ability to conduct coalition warfare.

## DEVELOPMENT PROCESS

To develop this part of the plan, USSPACECOM followed the analytical process in Figure 8-1.

The process began with a review of USSPACECOM's 2020 warfighting capabilities. We then assessed mission-enabling technologies to find partnering potential. With a lot of help from important stakeholders, we carefully reviewed organizations, policies, and international agreements to develop partnership opportunities that we could assess against goals for GP. Our study sources for this concept included:

- National Defense Industrial Association's Summer Study
- Industry Surveys

- Spacecast 2020
- New World Vistas
- Conferences of the National Space Foundation
- USSPACECOM Mission Area Assessment Working Group Studies

Based on these sources and our assessment, we discovered some candidate concepts which are outlined in the following sections.

## END STATE

Global Partnerships' end-state for 2020 revolves around USCINCSpace as the acknowledged **operational** leader for US military space. USSPACECOM will coordinate and advocate military space requirements for all Unified Commands within the inter-agency forum. When tasked, we'll lead the US military's interaction with other space organizations, domestic and international.

Early in the 21st Century, space issues will be solved via a streamlined interagency decision-making process resulting from the creation of a national space coordinating body. This body, using an integrated perspective, will focus space-related budgets, legislation, and policy. Much like other spacefaring nations, the United States will have educational programs and symposia that considers international space issues. Our government will promote US space policy and needs in the United Nations as well as within other international organizations. To meet this goal, the government will use commercial, military, and civil space programs in a coordinated way along with non-governmental organizations such as the new International Space Foundation. Similarly, a strong, centralized organization will emerge within the DoD to represent US military concerns about space at the national level.

The US military's space operations in the 21st Century will be part of an international effort. Spacefaring nations will recognize the need to ensure safe space operations and be willing to cooperate to achieve those goals. By 2020, we'll have sophisticated space law to establish appropriate safe behavior in space. The need to protect all assets in space will lead to international agreements and treaty revisions that provide for using force

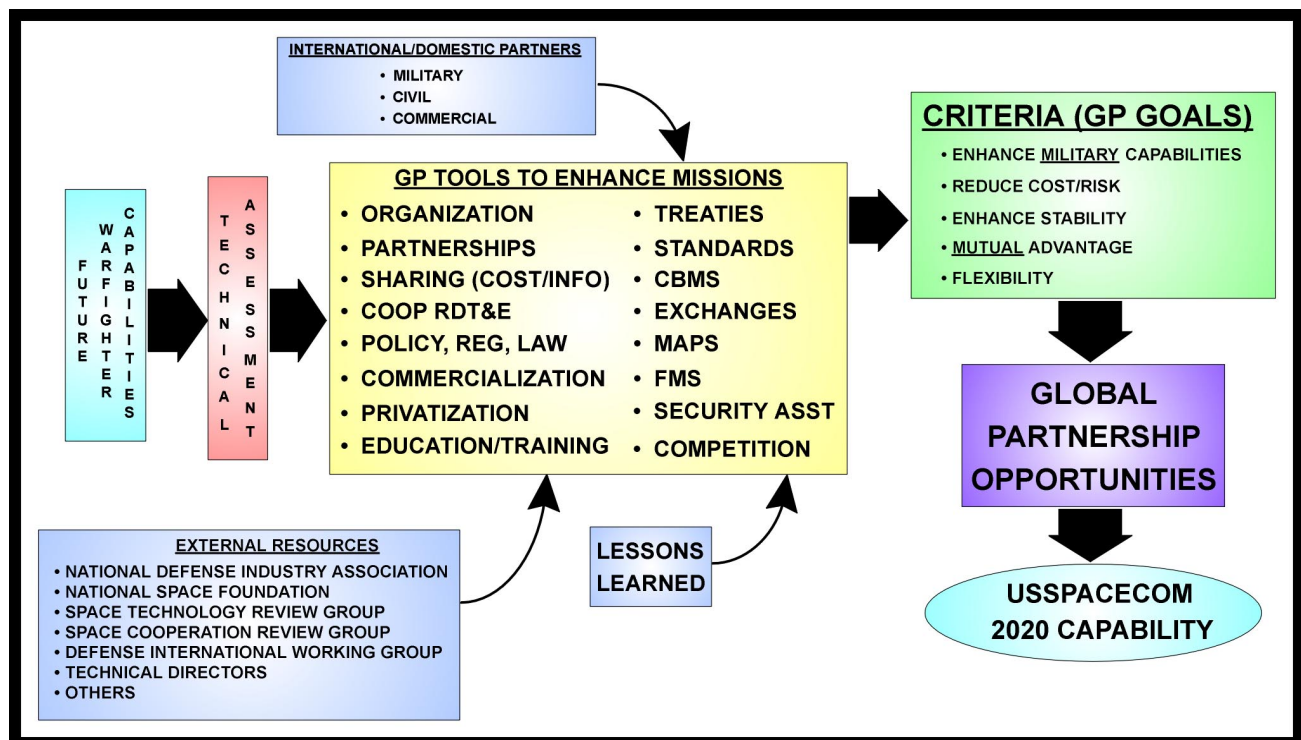


Figure 8-1 Analytical Process for Global Partnerships

to enforce these laws. Through carefully considered cooperative agreements, the United States would share this responsibility with allies who contribute to the effort. For example, diplomatic agreements may offset the size and cost of USSPACECOM's space surveillance mission by reducing the amount of space debris from greatly increased space commerce. We may also see ground inspections of most space payloads which will assure everyone that illegal space weapons of mass destruction aren't going into space. As a result, we could reduce resources devoted to space surveillance. Finally, under the enduring tenets of our National Security Strategy, the United States will retain the right to act unilaterally when its national interests are threatened.

Under direction of the NCA, and as supported by the international community, USCINCSpace would develop a sophisticated ability to help enforce space law. The United States and its allies will guarantee the safety of space and be able to deny the use of space to those who threaten that safety. Sharing arrangements involving surveillance, warning, launch, and other mission areas—as well as standardization and interoperability—should contribute much to deterring hostile action in space and enhancing confidence in coalition warfare. USCINCSpace will retain the sensors needed to

precisely locate space objects for targeting, as well as other capabilities specific to the military.

USCINCSpace will also develop enduring partnerships with the aerospace and space-support industries. A careful balance of partnering and calculated risk will result in mutually beneficial arrangements that lead to surge launch, enhanced communications and imaging, and other supplements to core capabilities. Stronger interaction between the military and industry in developing requirements could allow integration of military capabilities into commercial satellites. Confidence will increase in these processes, along with multi-year contracting and cross-agency bulk purchases of launch and other space services. These changes will lead to more research and development on military problems by industry and may lower the cost of military goods and services.

A space culture within the military will fit comfortably among traditional military missions. Space “stovepipes” will be greatly diminished as a result of a mission-based, integrated, systems approach to acquisition decisions. Buying commercial space services, instead of building, operating and maintaining our own, will streamline military space forces to focus on core capabilities.



With appropriate agencies, USSPACECOM will help shape the international space environment so the United States will retain its lead in military and commercial space technology. The military would still have expertise in space-support operations by reshaping the education-with-industry program to produce military people who know space launch, communications, and other specialized areas.

## ASSUMPTIONS FOR ACHIEVING GLOBAL PARTNERSHIPS

USSPACECOM's other operational concepts have justified the validity of many of these assumptions.

- Success in developing Control of Space and Global Engagement relies on our national leaders' recognizing space as a center of gravity.
- To field systems for space engagement, we must first extend national space policies to develop a space "code of conduct."
- Full Force Integration depends on USCINCSpace's strong leadership developing and executing the military's operational capabilities in space, particularly those which cross current organizational lanes.

USCINCSpace's ability to "shape the space environment" from a position of authority and expertise will play a major role in retaining US superiority in military space operations and technology. In keeping with the National Security Strategy, the DoD and USCINCSpace must ensure we retain the right (and capability) to act unilaterally in support of national interests. Of course, that would likely be a "last resort"—after alliances or coalition operations are exhausted.

USCINCSpace will continue to act as the senior military advocate for space operations within the DoD and among other agencies whenever appropriate. USCINCSpace's authority to act in this role is granted under the 1998 Unified Command Plan which includes:

- "Advocating Space (including Force Enhancement, Space Control, Space Support, and Force

Application) and Missile Warning Requirements of Other CINCs."

- "Serve as the Single Point of Contact for Military Space Operational Matters...."
- "... Provide Military Representation to US National Agencies, Commercial, and International Agencies for Matters Related to Military Space Operations...."
- "... Planning and Implementing Security Assistance Relating to Military Space Operations..."

In fulfilling this authority, USCINCSpace will work with other CINCs to develop consensus on military space issues, and articulate these views in a single voice for military operations while coordinating with other agencies. Other important assumptions for Global Partnerships are:

- USCINCSpace leads US military space operations.
- National agencies will collectively reevaluate and modify their roles.
- The United States will usually contribute to major theater conflicts as a coalition member.
- Using Space forces may be the only US contribution to a coalition war.
- Strengthening US security is the main consideration in developing partnerships; cost considerations and information sharing won't compromise sensitive capabilities.
- Many organizations will want military space capabilities such as warning or surveillance, providing the United States more partnering opportunities.
- The military/commercial relationship will mature and support more innovative agreements of mutual benefit.
- NCA will recognize space as a center of gravity.
- Stiff competition for influence of the space medium will lead to an extensive "code of conduct" in space.

Additionally, USCINCSpace will strongly influence domestic and international partnering activities in space—with appropriate civil/national, military and commercial agencies (see Figure 8-2).

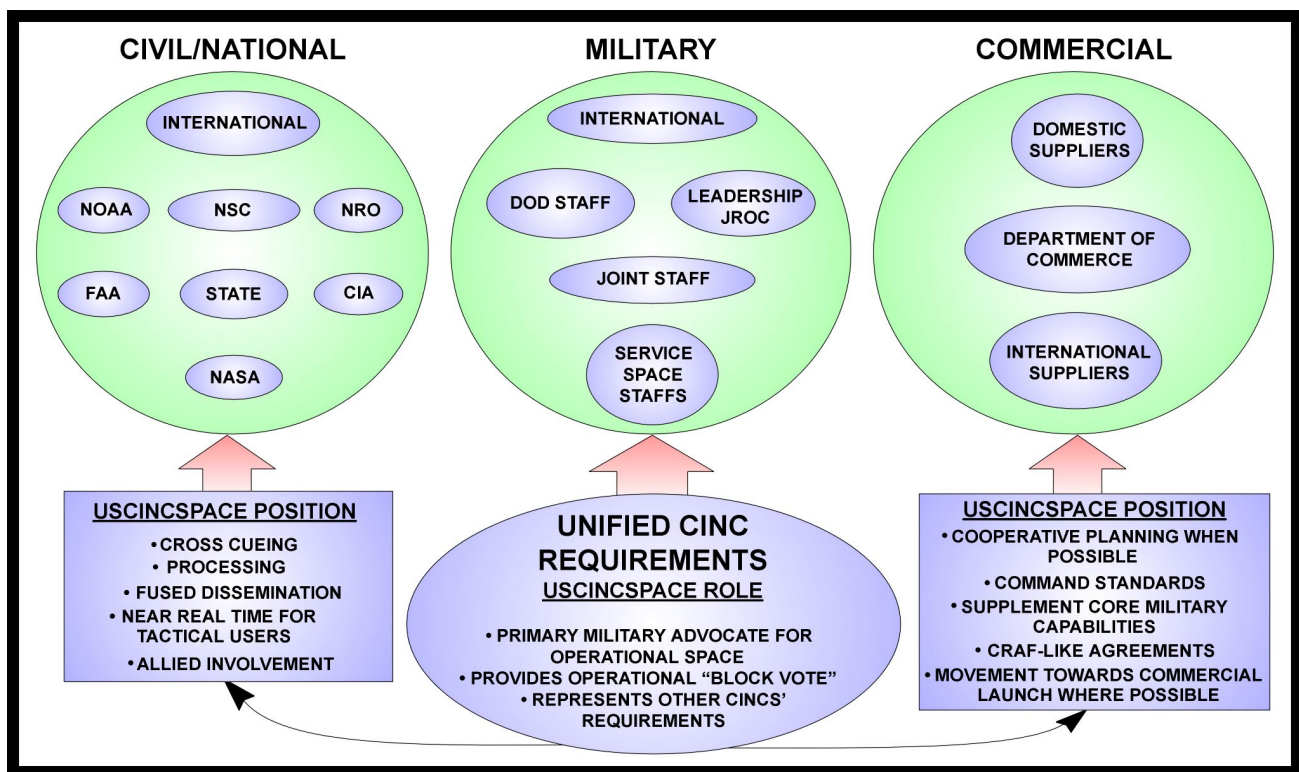


Figure 8-2 Organizational Relationships for Global Partnerships

## KEY CONCEPTS FOR PARTNERING

The following concepts, recommendations, and action plans apply to more than one mission area. They define processes and concepts important in fostering partnering across many military space capabilities related to space.

### Key Partnering Concepts

- Distinction between core and non-core military space activity
- Single Operational Focal Point
- Integrated Systems Approach
- Capability and will to shape the environment

### Core and Non-Core Military Activity in Space

To relieve pressure on the US military infrastructure, we must carefully decide which space missions are core competencies and which ones we

can consider for partnering. The goal of this activity is to create a more flexible and cost effective space force by focusing on core capabilities. It's tough to see partnering in functions such as launch or surveillance because they've been military missions for more than 30 years. But, these traditions began because of overriding national security requirements and because no commercial demand or ability existed to perform them. The situation has changed because space applications have grown rapidly and commercial abilities have emerged to meet them at lower cost. Many large industries have transitioned from building everything to buying services while retaining essential core abilities. For instance, an international petroleum firm recently divested its drilling operation, recognizing that drilling wasn't a core function (discovering and marketing oil were). Concentrating on its core business allowed the firm to get a "best-in-class" partner to do the other missions for less money and still improved its core performance. For example, GPS operations, traditionally considered a core military function, may be a worthy candidate for transition to commercial management.

Characteristics of USSPACECOM's core and non-core functions are:

#### Characteristics of Core USSPACECOM Functions

- Ability to act unilaterally
- High impact or sensitive systems
- Wartime critical functions
- Operational functions (execution)
- Involves leadership roles and responsibilities
- Financial considerations are secondary
- Sharing could injure us
- Lethal
- Potentially deployable
- Security considerations are key

#### Characteristics of Non-core USSPACECOM Functions

- Financial constraints and considerations are paramount
- Sharing value as confidence building measure in coalition warfare
- Loss or compromise of data is not critical
- Commercial counterpart exists
- Already accessed to some degree; available on the world market
- Commercial off-the-shelf products exist
- Not lethal
- Rooted in space law
- Employed in routine operations
- Reduces DoD's costs in the long term

The actions USCINCSpace must take to determine the potential of commercial partners and get the most from providers of non-core services are:

**(Directive)** Further define criteria to distinguish core and other activities. (SP/J5)

**(Directive)** Identify "best-in-class" commercial firms for potential partnerships on non-core activities. (SP/Components)

We should emphasize policies and strategies needed to coordinate the civil, commercial, and national security sectors of space.

*NDP Report, December 97*

**(Directive)** Establish partnerships that save money and add capability. (SP/Components)

### Single Operational Focal Point

Streamlined decision making across institutional boundaries will be necessary to maintain our leadership in space. A strong military focal point may help break deadlocks among agencies, and that's what we need to rapidly develop partnerships that supplement military capabilities. In fulfilling the UCP's responsibilities, USCINCSpace can advocate developing more streamlined decision making on space within the DoD and create a united DoD front among other agencies.

Maintaining US leadership in space through 2020 may require a leading organization chartered to guide government departments and agencies in coordinating at the strategic level. This group would also assist industry's partnering actions with domestic and international space activities at the strategic level. They would streamline the bureaucracy associated with the new partnerships, policy and legislation, and generally help the nation's space program to guarantee its preeminence through 2020 and beyond.

External actions USCINCSpace may need to take to fulfill military leadership responsibility in space:

**(Directive)** Determine limits of partnering with foreign militaries to support core and other missions. (SP/J5)

**(Directive)** Discuss laws and enforcement strategies with the DoD's leadership to convene interagency forums on the topic. (SP/J5)

**(Directive)** Advocate a draft outline of 2020 space law and enforcement code, along with supporting US policies. (SP/J5)

**(Directive)** Get the authority to support partnering of non-core missions with potential international partners. (SP/J5)

Internal actions USCINCSpace can carry out to fulfill a leadership role in space:

**(Directive)** Evaluate an integrated organization to improve mission staffing. (SP/J5)

**(Directive)** Create a new staff organization and adjust activities to carry out responsibilities in the UCP. (SP/J5)



**(Directive/Recommendation)** Flesh out the process for generating requirements and develop consensus on future roles for CINCs and the Services. (SP/Components)

## Integrated Systems Approach

A distinct line exists between a CINC's role for military operations and the Services' responsibility to organize, train, and equip. However, USSPACECOM's responsibility for joint and combined space operations as well as interests in civil, commercial, and national space systems creates a unique and broad perspective. In conceiving an overarching plan for space strategy through 2020, we discover many space relationships not obvious to a single service or civil agency. Identifying common requirements or opportunities for efficiencies across service and civil programs can benefit everyone. An example is the requirement to observe and report space meteorological data. Auxiliary payloads designed to observe the ionosphere and beyond could report efficiently if they took advantage of many civil, military, national, and commercial platforms. A similar requirement exists for secondary payloads to support navigation and attack verification. The chances for efficiencies multiply if we arrange for common designs and interfaces on attack sensors and transponders, instead of having all space systems integrate such secondary payloads independently.

Although USSPACECOM's role doesn't include determining space-system designs, the command's perspective on such matters is important. A closer partnership between USSPACECOM and the Services' space acquisition staff could improve warfighting abilities.

USSPACECOM may support trades between material and nonmaterial solutions to resolve difficult, common problems. For instance, surveillance of space to provide safe navigation could combine material solutions for surveillance with agreements to decrease debris.

Finally, USSPACECOM is uniquely positioned to help consolidate missions and debate upgrades to capabilities in space and other mediums. For example, the Air Force and Army will soon have to decide on second and third-generation programs

for AWACS and JSTARS. Although moving either of these missions individually to space may not be cost effective, combining their requirements in a space-based system could be. If we add USSPACECOM's requirement to surveil space to the same system, even greater efficiencies could further justify this decision. Other missions, such as warning, may benefit from this kind of thinking.

## Shaping the Environment

International competition in space-related fields, along with divergent national goals of the emerging space powers, threatens future operations in space. Before activities infringe on USSPACECOM's future ability to do its mission, we should try to shape the future space environment so it is advantageous to the United States and its allies. A strategy of mutual dependence, which requires all spacefaring nations to contribute and cooperate for mutual benefit, should deter aggression and foster enduring relationships. Figure 8-3 provides a logical template for "shaping the environment" to support Global Partnerships.

Development of enforcement policies and means is also presumed, since without the former, the latter may be unattainable. A key element in attaining the 2020 Vision is the common need for assured access to space. Increasing competition for influence in space will lead to a code of acceptable behavior for its common use. This logic flows naturally toward enforcement against the state to interfere or disrupt this balance in space or elsewhere.

This cooperative environment should produce dependencies, reducing our cost of unilateral enforcement.

## Partnering With Industry Research and Development

The USAF Space and Missile Systems Center (SMC) has arranged with portions of the space industry to improve the USAF's understanding of industry planning and investment, and vice versa. This shared, parallel planning (see Figure 8-4) can make industry confident enough in the military's 2020 requirements to shift their

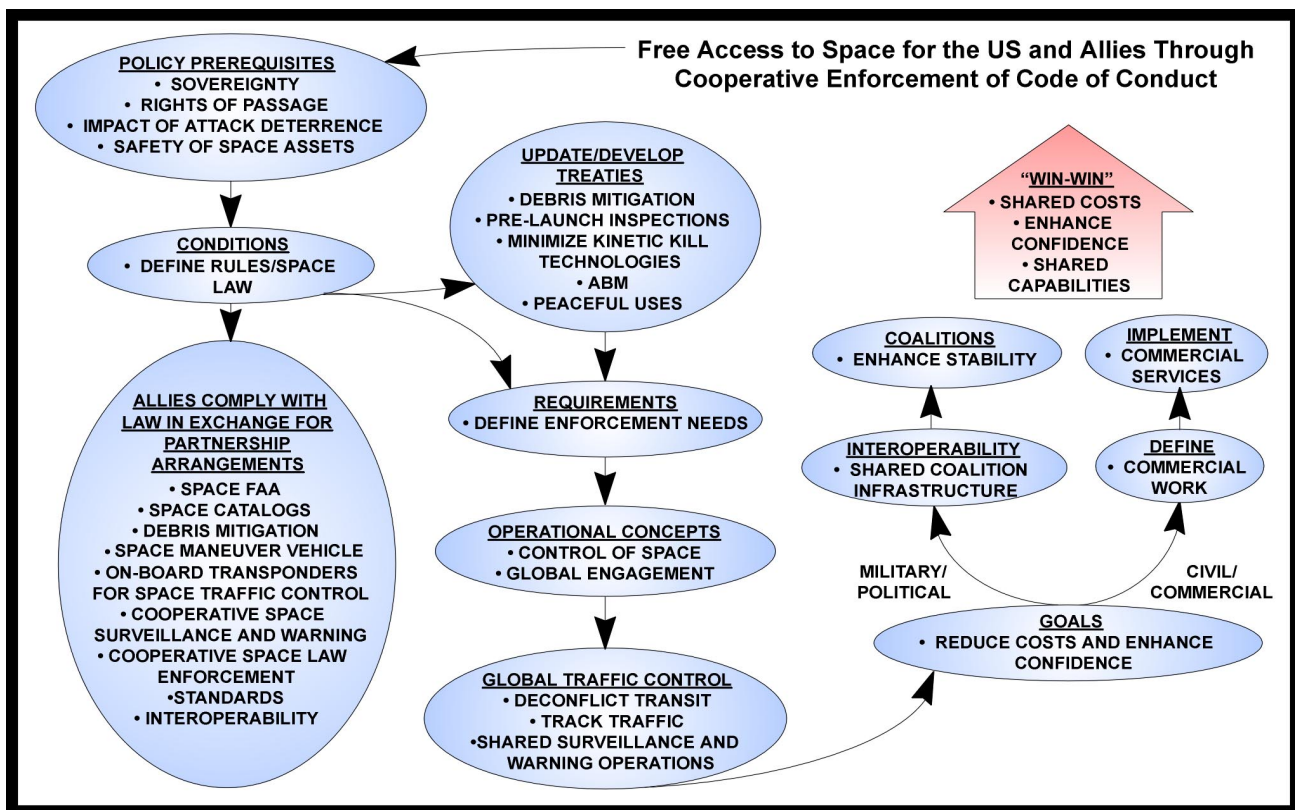


Figure 8-3 Shaping the Environment for Global Partnerships

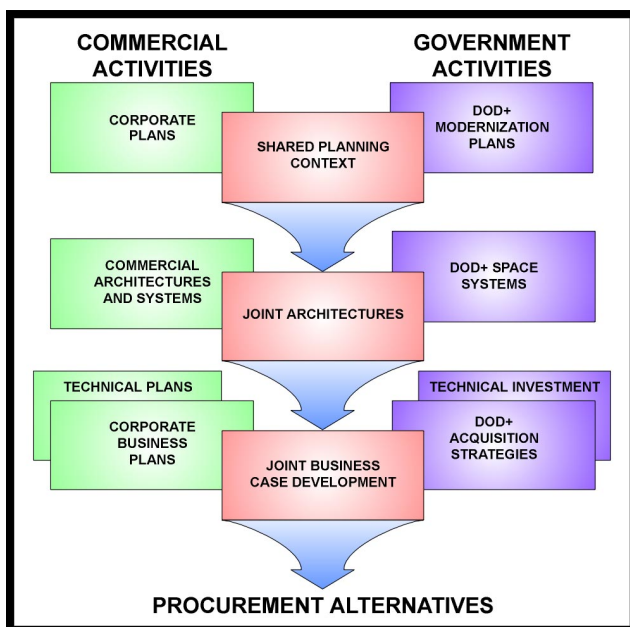


Figure 8-4 Shared Planning Process

investment toward technologies that apply directly to them. A closed planning horizon also allows partners to leverage each other's systems, production abilities and technologies. Cooperative planning at this level could develop architecture or system designs that satisfy both

partners' requirements at a lower cost. Such relationships could enable the military to understand their commercial partners' planning and decision making, and influence product lines to incorporate DoD's space requirements. DoD and commercial planning provide long-term (10-15 years) forecasts and assessments of future systems and technology trends in commercial, civil, and international space system. The SMC's effort leverages commercial partnerships. It assesses the drivers for commercial space markets, technology, and government policy to forecast development of space systems and technologies. Good partnerships depend on business plans that spend appropriated funds to foster joint architectures and systems. We can develop mutually similar relationships with civil and national partners.

What USCINCSpace can do to help gain efficiencies in developing space systems:

- Facilitate adoption by acquisition-center commands.
- Develop commercial liaison staff, possibly part of the group that carries out our LRP to help integrate joint ventures.



# ROADMAPS FOR PARTNERSHIPS

We've identified some partnership opportunities with high potential for the three previous operational concepts in this plan.

Although some functions have high partnership potential, USSPACECOM must determine how much core military capability to retain within each mission area. Timeline goals are primarily determined by the Control of Space, Global Engagement and Full Force Integration roadmaps.

Usually, initial actions assess whether partnering makes sense within the specified objective and recommends research for decision makers to consider. Later actions suggest an approach for carrying out workable concepts.

## Partnering for Control of Space

Figure 8-5 shows partnership opportunities for four of the five specified objectives in Control of Space: Surveillance of Space, Protection, Prevention and Assured Access. Notice, we have no opportunities for partnering in Negation.

## Surveillance of Space

Surveillance of Space has a high potential for partnerships in two main areas:

- Internationalization of Space Surveillance Network (SSN) Services
- Commercialization of SSN Services

### Internationally Develop Services for the SSN

Partnering can reduce duplication of commonly required functions among the DoD, NASA, and the European Space Agency (and potentially others). We may save money by expanding the SSN through "augmentation sensors" from foreign countries and by increasing the number of sensors on other constellations. These potential efficiencies suggest cost benefit analyses to determine whether we need immediate action. Authorized prelaunch inspections on the ground and other policy changes on reducing debris promise savings. They should limit the surveillance network's burden and extend the time until the system needs extensive improvements.

Several partnerships within this area are already underway. Other opportunities will emerge from a review of the 1960 SSN policy and recognition

Operational Concept	Specified Objective	High Partnership Potential	Action Plan Timeline
CONTROL OF SPACE	Surveillance of Space	Internationalization of SSN Svcs	Figure 8-6
		Commercialization of SSN Svcs	Figure 8-7
	Protection	Attack Verification	Figure 8-8
	Prevention	ID Unauthorized Users	Figure 8-9
	Negation	None	None
	Assured Access	Launch on Demand/ Rapid Response	Figure 8-10
		Global Traffic Control	Figure 8-11
		Satellite Operations	Figure 8-12
		Commercial Spaceports	Figure 8-13

Figure 8-5 Assessing Potential of Partnerships for Control of Space

by many firms of the need for space surveillance services.

We also need to consider commercial contributions to maintain databases—one of business' basic strengths. Commercial firms could give us increased reliability, data integrity, and savings of people and money while maintaining reasonable security for military objects in the space object catalog. The US military would continue to maintain databases with precise locations of satellites for targeting or other data vital to military security.

As shown in Figure 8-6, international participation could increase capability and share the cost of improving the SSN. By using sensors and surveillance data from foreign governments (technical issues notwithstanding), we could reduce our overall operating costs for the SSN. Also partnering might lead to allies and coalition partners helping to reduce debris and agreeing to prelaunch inspections that would reduce requirements to characterize objects in space.

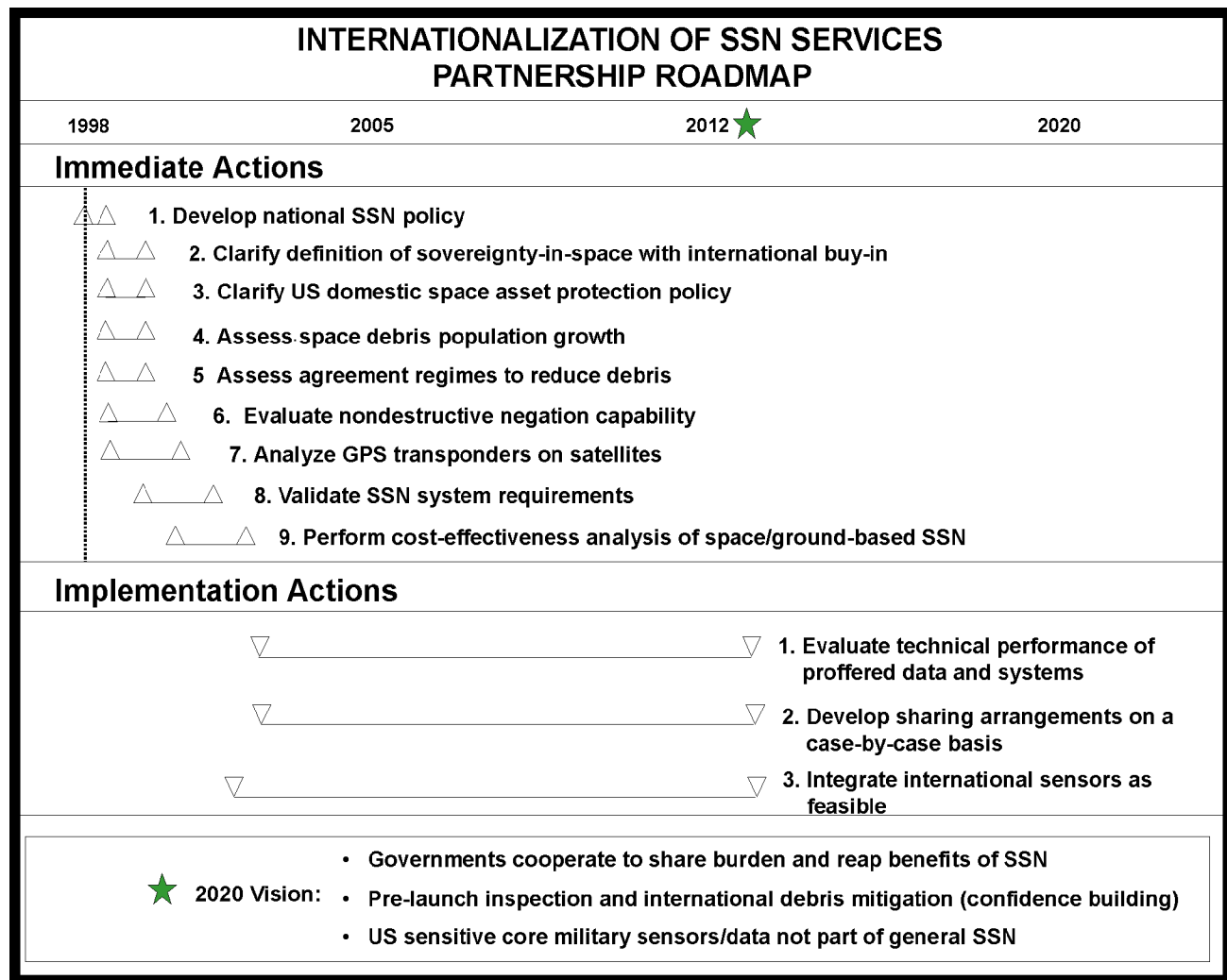


Figure 8-6 Roadmap for International Partnerships to Provide Services for the SSN

### Commercially Develop Services for the Space Surveillance Network

The explosive growth of space systems implies the need to cooperate on, and possibly to commercially develop, some abilities to identify and characterize space objects (Figure 8-7). Characterizing space objects requires a lot of resources, which warrants an attempt to reduce the task in the future. Commercial satellite operators have said

they would pay for characterizing their payloads' status after launch. International agreements to inspect commercial, civil, and some military payloads before launch could greatly reduce the need to characterize space objects after they're in orbit. Allied participation in pre-launch inspections could build a lot of confidence in partnering activities.

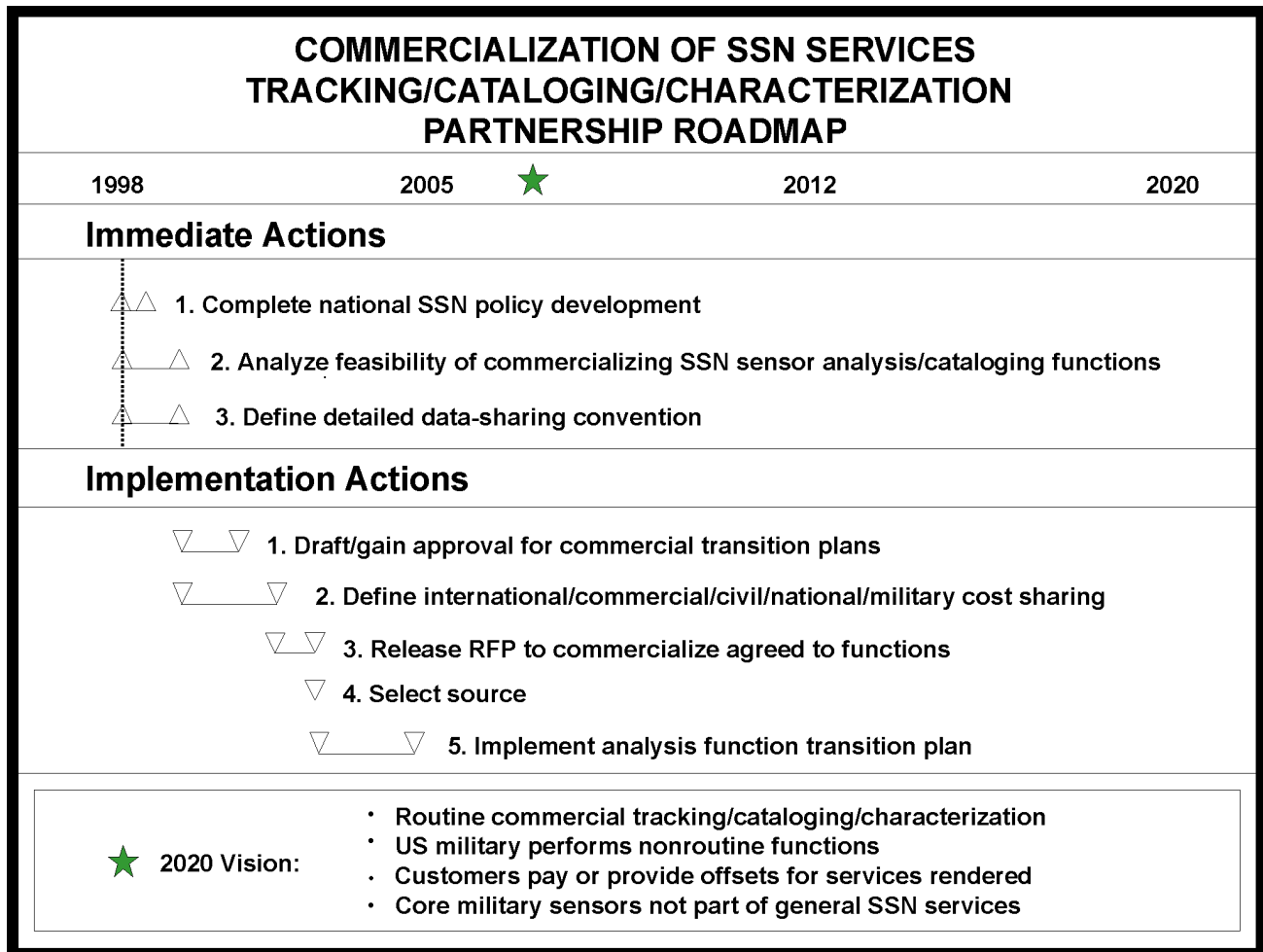


Figure 8-7 Roadmap for Commercially Developing Services for the SSN



## Protection

Civil, military, and commercial satellites are all vulnerable to a wide array of attacks. This mutual concern should move us toward partnering to protect them. Arrangements could include cooperative research and development, standard interfaces, and sharing and distributing threat information. Governments and nations could share information on suspected or confirmed attacks to assess threats and help speed countermeasures (Figure 8-8). To keep costs low for individual players, we could:

- Develop standard protocols for sensors
- Cooperatively research and develop lightweight sensors and communications packages

- Hold spacefaring conventions to identify common threats
- Develop agreements with commercial vendors—similar to the one for the Civil Reserve Air Fleet (CRAF)—to offset the costs of mounting these components.

We also recommend a treaty among spacefaring nations to share information on suspected or confirmed attacks. Standards for system interfaces and cross-linking communications would also help us share attack information. Given a clear threat, commercial groups may be willing to integrate sensors and support this mission on their own.

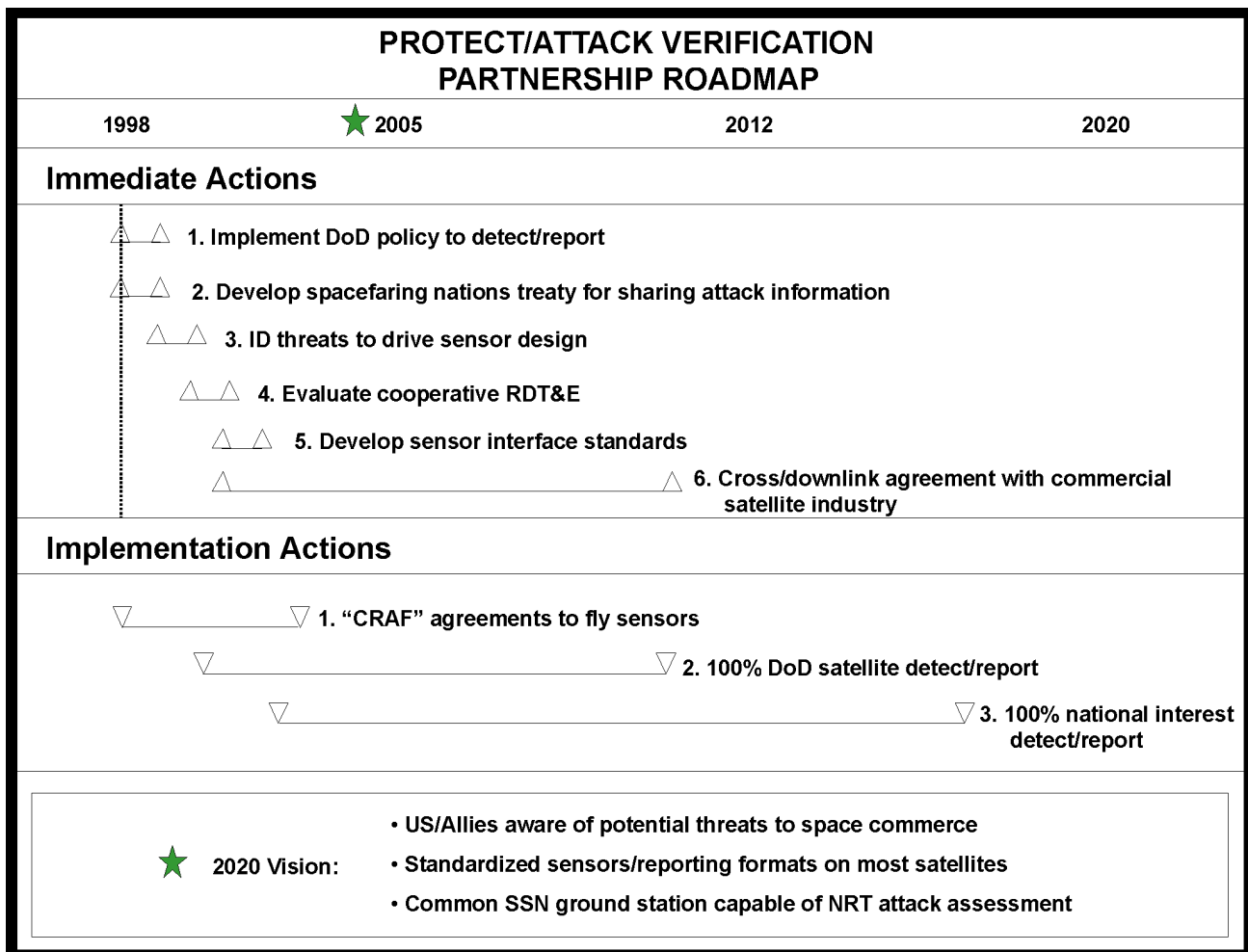


Figure 8-8 Roadmap for Partnerships in Protection and Verifying Attacks

## Prevention

It is vital for many reasons to positively ascribe unauthorized usage and exploitation of US, allied and neutral space systems to a source. During military operations, identification can be crucial to battlefield success. Some commercial capability may already exist, but could result in its earlier or less expensive fielding.

Prevention is a very difficult mission technically, but has a high potential for cooperation (Figure 8-9). (For example, financial institutions have experience tracing and identifying unauthorized users who try to move bank accounts illegally.)

Primary partners would be commercial security vendors, law enforcement departments, and commercial space consortia. A consensus approach using coalition and diplomacy offers solutions that

systems alone cannot achieve. Major progress towards the Prevention objective will rely on agreements that allow us to detect, identify, and, when necessary, deny adversaries the unauthorized use or exploitation of space systems. Agreements to deny or penalize detectable use by third parties and cooperative investigation policies, cooperative collection and integration of data, and tagging protocols could help track system usage and assist in identifying the source of illegitimate data access.

Additionally, the DoD should adapt any commercial technologies and security procedures which inhibit pirating space systems by any potential space adversary.

Both nonmaterial and systems solutions always fall short of military actions.

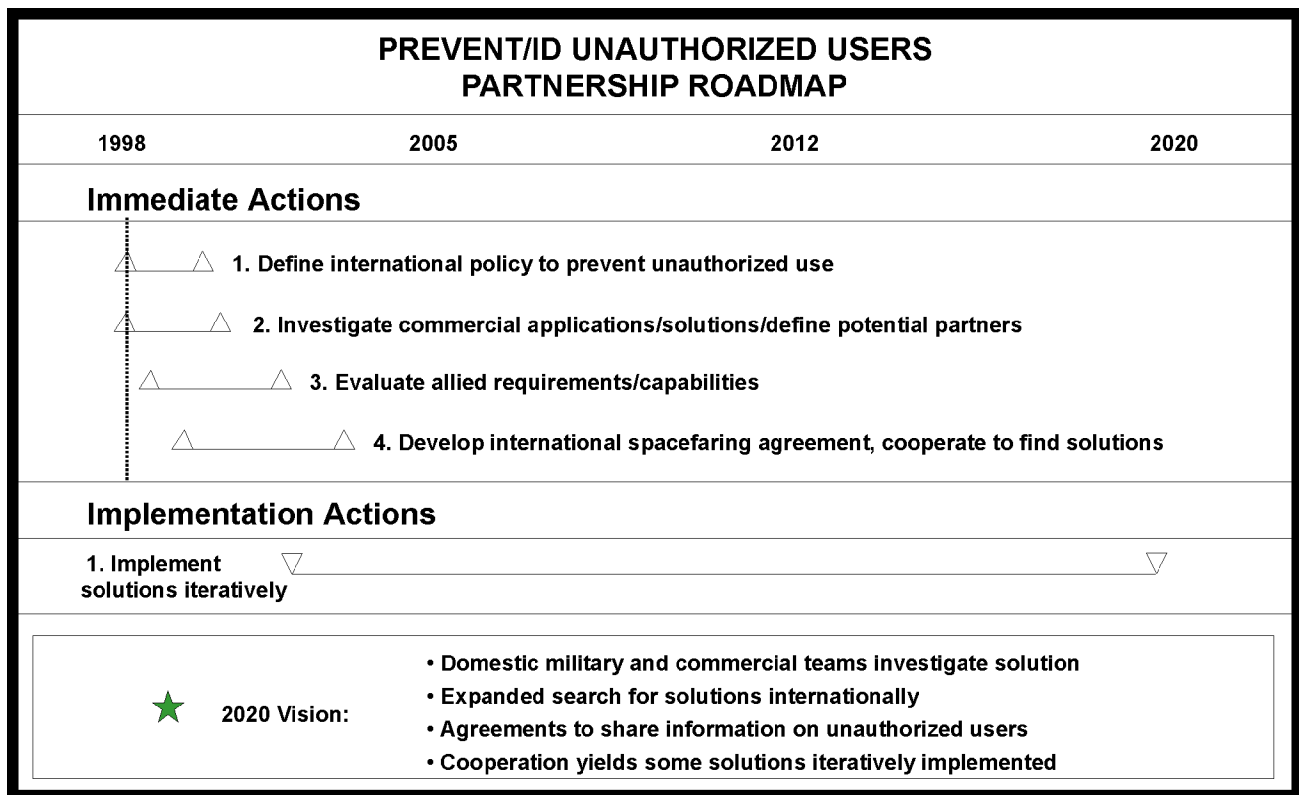


Figure 8-9 Roadmap for Partnering to Identify and Prevent Unauthorized Use of Space

## Assured Access

Assured Access has a high potential for partnerships in four main areas:

- Launch on demand for rapid response, reconstitution, and repair
- Global traffic control
- Satellite operations
- Spaceports

### Launch on Demand for Rapid Response, Reconstitution & Repair

To launch systems quickly, we may need a space-launch site or national spaceport that can launch at the projected rates. Partnerships appear attractive in this area despite stiff foreign competition in this lucrative future market (Figure 8-10).

Programs to develop space vehicles will give way to more efficient methods of placing valuable payloads on orbit. Until space operations vehicles or reusable launch vehicles provide rapid transport to space, USSPACECOM should consider advocating expanded access to international launch capability. Eliminating barriers to the international launch market for chosen military payloads may allow a near-term solution to launch requirements if we can resolve issues on security and technical interfaces. Reconstituting and repairing satellites also lend themselves to partnering, especially among government agencies. For the commercial market, replacing may always be more attractive than repairing because of relative costs and rapid advancements in technology.

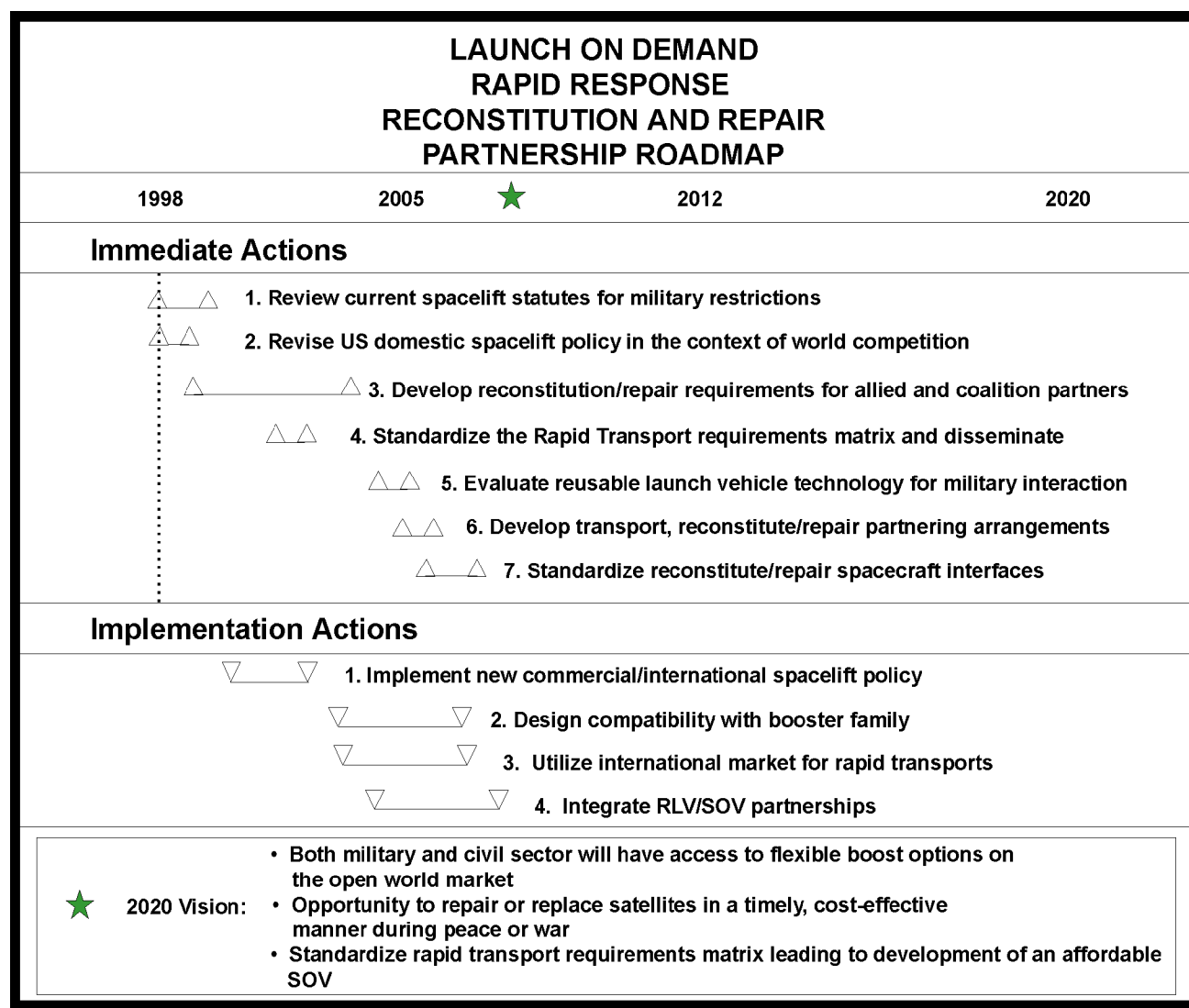


Figure 8-10 Roadmap for Partnerships to Cover Launch on Demand, Rapid Response, Reconstitution and Repair



### Global Traffic Control

A dramatic rise in the number of space objects and debris will mandate positive control of traffic traversing the air/space boundary and operating in space. Global traffic control has a high potential for partnering because it benefits all spacefaring nations. It would deconflict launch and reentry, oversee tracking and cataloging, warn of impending collisions in space, and monitor compliance with safety conventions. Recent events which imply the potential of collisions between boosters and debris are causing government entities to begin consideration of regulations which will require evaluation of collision possibilities on a launch-by-launch basis. This burden should be shared by all spacefaring nations.

Partnering will be critical for success in this area. For example, a key traffic control development will be the creation of a US government entity similar to the Federal Aviation Administration. This

“Space FAA” will be crucial to facilitate deployment and operations of future capabilities such as the military space operations vehicle and will lead US efforts to develop cooperative global standards for routine air-to-space and space-to air traffic.

One issue to be worked would be identification of the enabling capabilities necessary for effecting global traffic control. One such capability might be the positioning of transponders on payloads to assist tracking and to reduce the need for radar surveillance. Regardless of the mechanisms employed, the key lies in their global acceptability and use. A key role of the “Space FAA” would be to advocate this goal and to ensure minimal, if any, conflict with US policy and procedures.

The timeline in Figure 8-11 suggests some of the immediate and follow-on action for global partnering in this area.

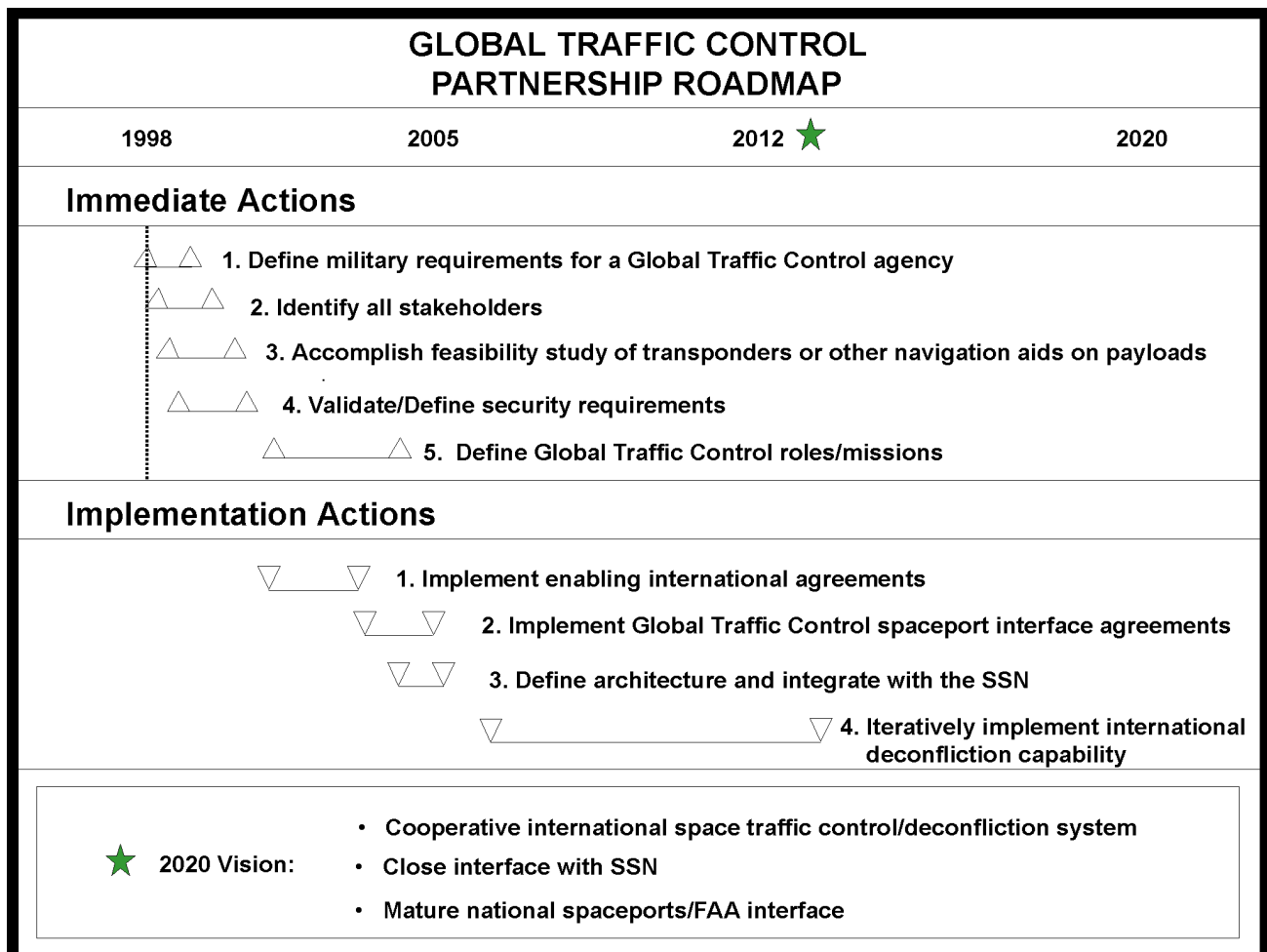


Figure 8-11 Roadmap for Partnering on Global Traffic Control

### Satellite Operations

The operational techniques of many military satellites closely parallels those of commercial systems. There is little difference between DoD's monitoring and commanding of a GPS satellite, and NOAA's or Motorola's operations in support of a GOES meteorological or Iridium communications satellite, respectively. Knowing where space vehicles are, how they are operating, commanding them to perform necessary tasks, and being able to retrieve the data they are tasked to provide are common to all organizations that operate space vehicles. With this in mind, we may be able to transfer uniformed service personnel from such jobs into core military functions.

As with many other functional areas, a key ingredient in achieving this goal lies in the development of standards, both in satellite bus components

and in communications protocols. The Satellite Communications Protocol Standards (SCPS) development initiative, co-sponsored by the DoD and NASA, is a representative step in this area, but others should be pursued, both in the domestic and global environments.

Industry may be able to operate military systems for less money. Further savings may result if industry is involved very early in systems development (including commercial operations in the design phase). Regardless, any partnering initiatives in this area must be closely tied to those being brokered in other areas such as SSN commercialization or Global Traffic Control. The following roadmap (Figure 8-12) defines several actions needed to move from uniformed to commercial satellite operations.

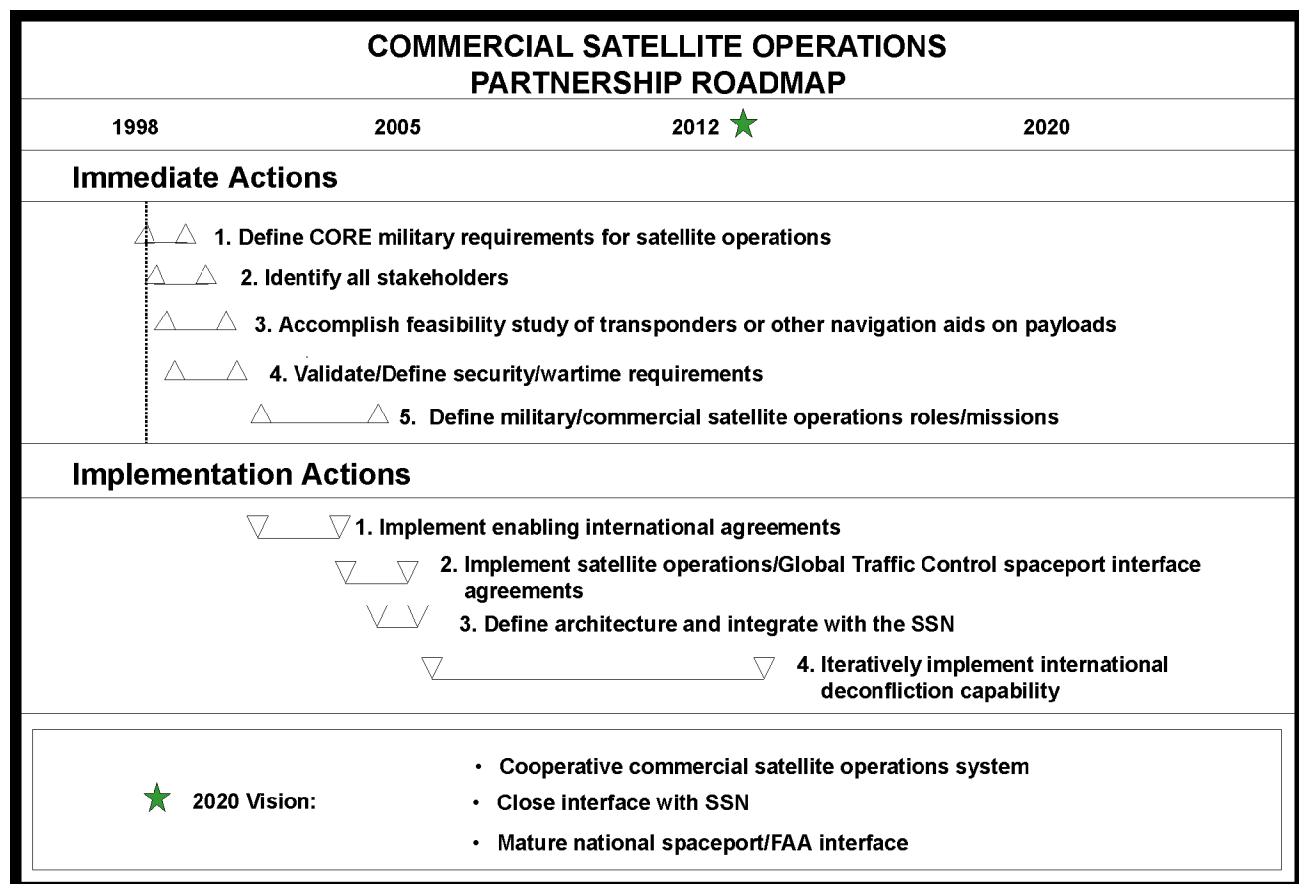


Figure 8-12 Roadmap for Partnering on Commercial Satellite Operations

### Spaceports

The US government provides the physical infrastructure and services for many launch functions, but most of these early designs won't support launching in volume. We can streamline launch if we consider a commercial approach (including design of the pad and supporting infrastructure, as well as range support).

- As a move in this direction, an intermediate step is to reduce the cost of operating existing ranges at Vandenberg and Cape Canaveral by standardizing ranges and modernizing the equipment.
- The US military must relook standing procedures for operating the ranges to ensure costly bureaucratic practices necessary in the past are

eliminated to make the government facilities competitive for commercial launch.

- Designs already exist for commercial launch pads that cost a fraction of current pads, require little maintenance, and can be refurbished in three to four days. These ideas could lead to a commercial spaceport that provides launch and launch services to military and commercial groups for much less money. A key disadvantage of this concept is passing the cost for services directly to the consumer, rather than being government subsidized. But even though spaceports could face tough international competition, they may be more cost effective and desirable in the future (Figure 8-13).

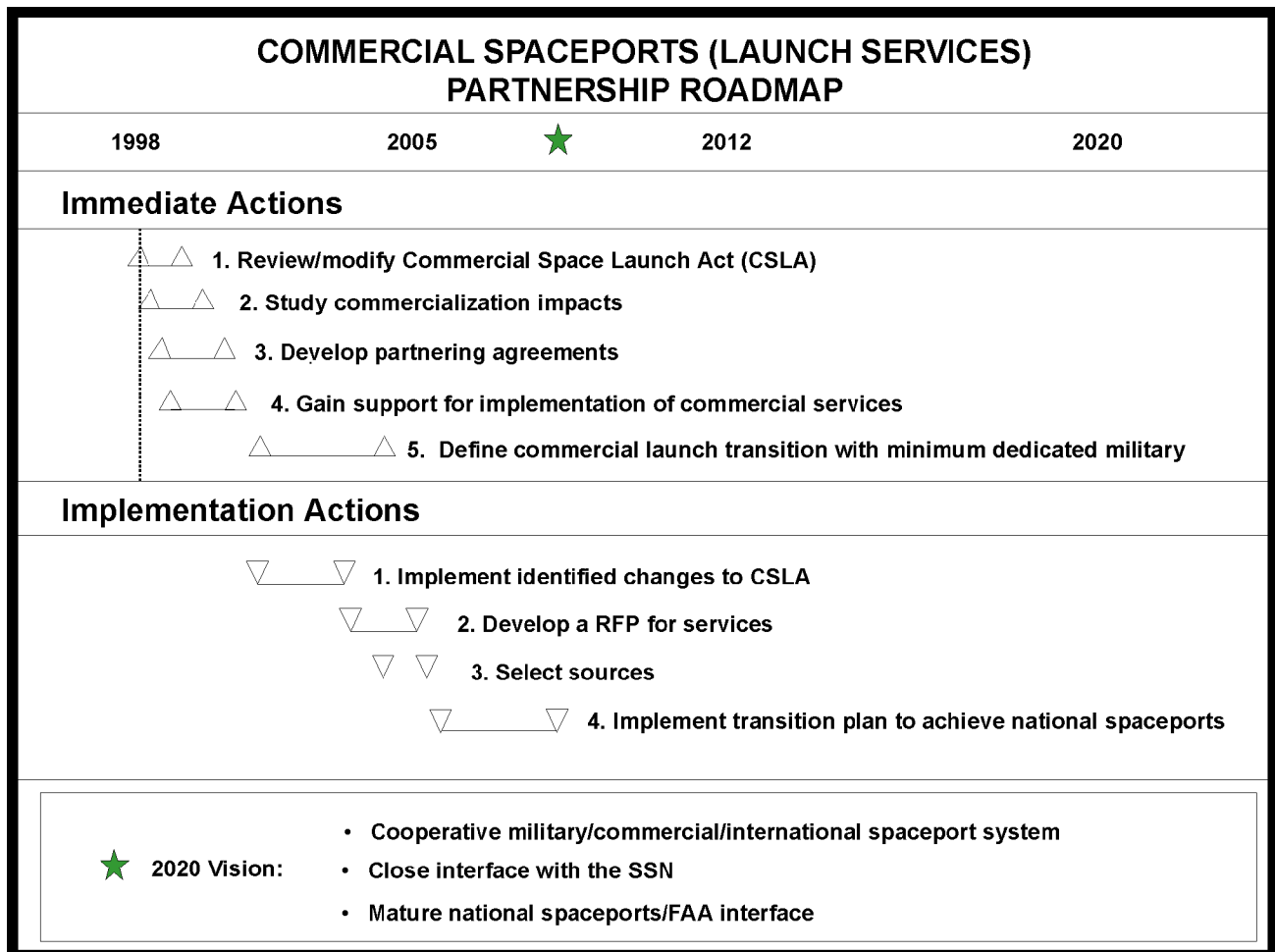


Figure 8-13 Roadmap for Partnering on Commercial Spaceports (Launch Services)



## Partnering for Full Force Integration

Integrating forces and information demands partnering in four FFI areas (see Figure 8-14).

### Information–Command and Control

Command and control consists of core and non-core capabilities (see Figure 8-15). Core operations and procedures transform data and information into understanding and knowledge for the military commander. Non-core areas are comprised of C2 support systems, such as communications networks to transport data and information, database and catalog systems, C2 applications and displays, and automation systems to process data

and information essential for feeding decision support tools. The gray area between core and non-core functions include hardware and software interfaces and operational procedures that transform data and information into knowledge for commanders. Partnering opportunities lie predominantly with the non-core functions, but may occur in the gray area, as well. Specifically integration, standardizing, and systems support all have a high potential for partnerships.

Allies and coalitions can partner in several important areas of C2. These include data standards, sensor standards, and common operational pictures for situational awareness. Standardizing and integrating C2 also improve our response to crises.

Operational Concept	Specified Objective	High Partnership Potential	Action Plan Timeline
FULL FORCE INTEGRATION	Information	Command and Control Communications for Command and Control MILSATCOM	Figure 8-16 Figure 8-17 Figure 8-18
	People	Training and Education	Figure 8-19

Figure 8-14 Partnership Potential for Full Force Integration

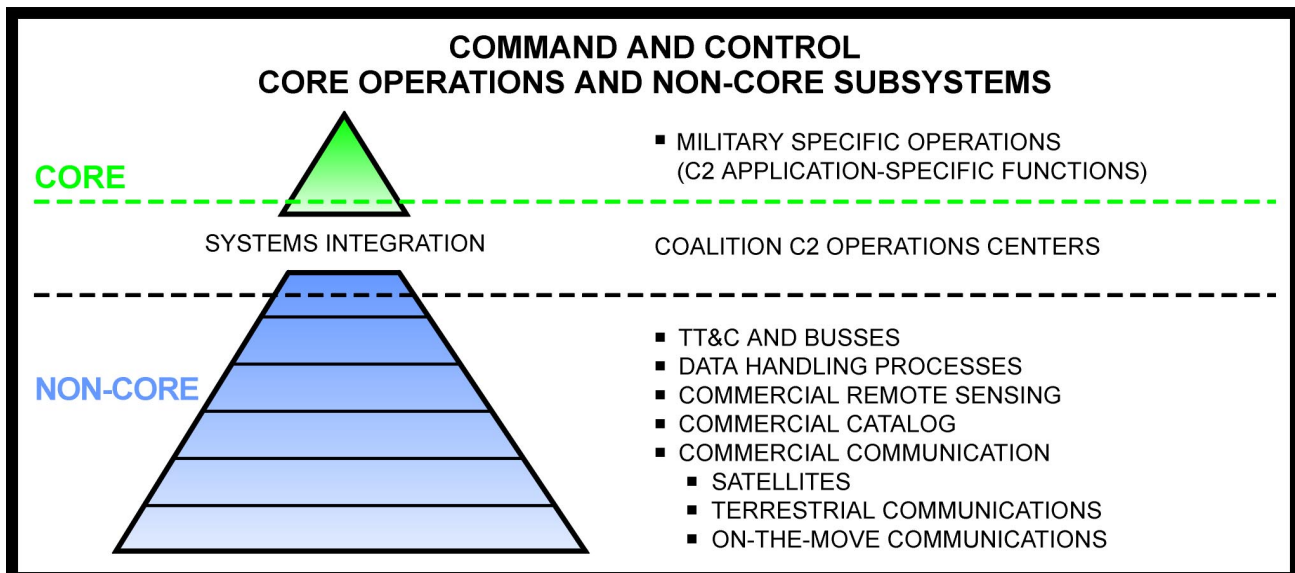


Figure 8-15 Core and Other Elements of Command and Control for Information

They don't preclude unilateral action but do enhance interoperability when coalition partners decide to coordinate their actions.

All US combatant commanders and their coalition partners will have a common need for monitoring air, ground, sea, and space actions. The view from space will be essential for the development of a common operating picture of the battlefield. Distribution of US-acquired data among global partners through integrated C2 networks, in return for collaborative decision making, additional sensor

inputs, or cooperation will be a challenging, but necessary action.

The timeline (Figure 8-16) suggests immediate and follow-on actions to support cooperative development of C2 systems. In addition to coalition partnering, leaders should strongly consider commercializing non-core activities. A near-term test case or commercial pathfinder should provide important data on industry's ability to provide commercial services.

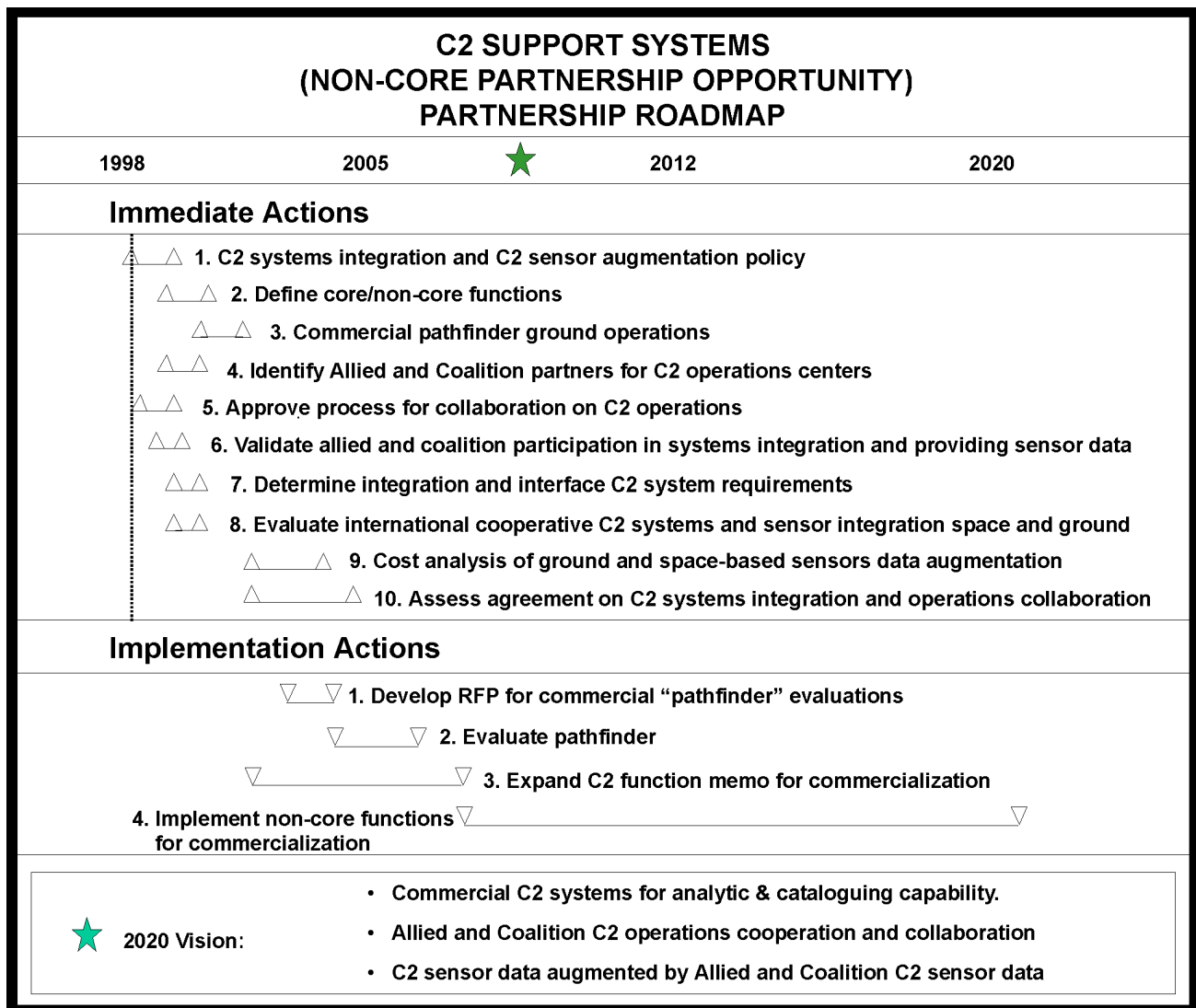


Figure 8-16 Roadmap for Partnering on Support Systems for Command and Control (C2)

### Information–Communications for Command and Control

As previously shown, we assess communications to support command and control as being a non-core C2 function. This area offers opportunities to develop partnerships that, in particular, will support US participation in coalition warfare.

The requirement for global satellite-based, high bandwidth communications with gigabit/second data rates is not unique for support of warfighting operations. A similar demand for such a capability exists in the international business market. In response, commercial companies are rapidly increasing their already substantial role in providing space-based global telecommunications. Many of the commercial systems being developed and employed provide almost exactly the same

capability as those being fielded at much greater cost by the US military. DoD partnering with commercial US and foreign satellite telecommunications companies, whether it be through anchor tenancy, partial investment in system development, or shared use of satellite bandwidth, offers tremendous potential for cost reduction with little, if any, loss in capability. In fact, with the commercial sector driving global system standardization, such an approach by the DoD will increase the potential for successful C2 integration with allies.

The greatest impediment to partnering in this area may be a bias that military C2 operations must inherently be a uniformed services function. Overcoming this perspective will enable DoD to leverage the tremendous potential of readily available, state-of-the-art global telecommunications.

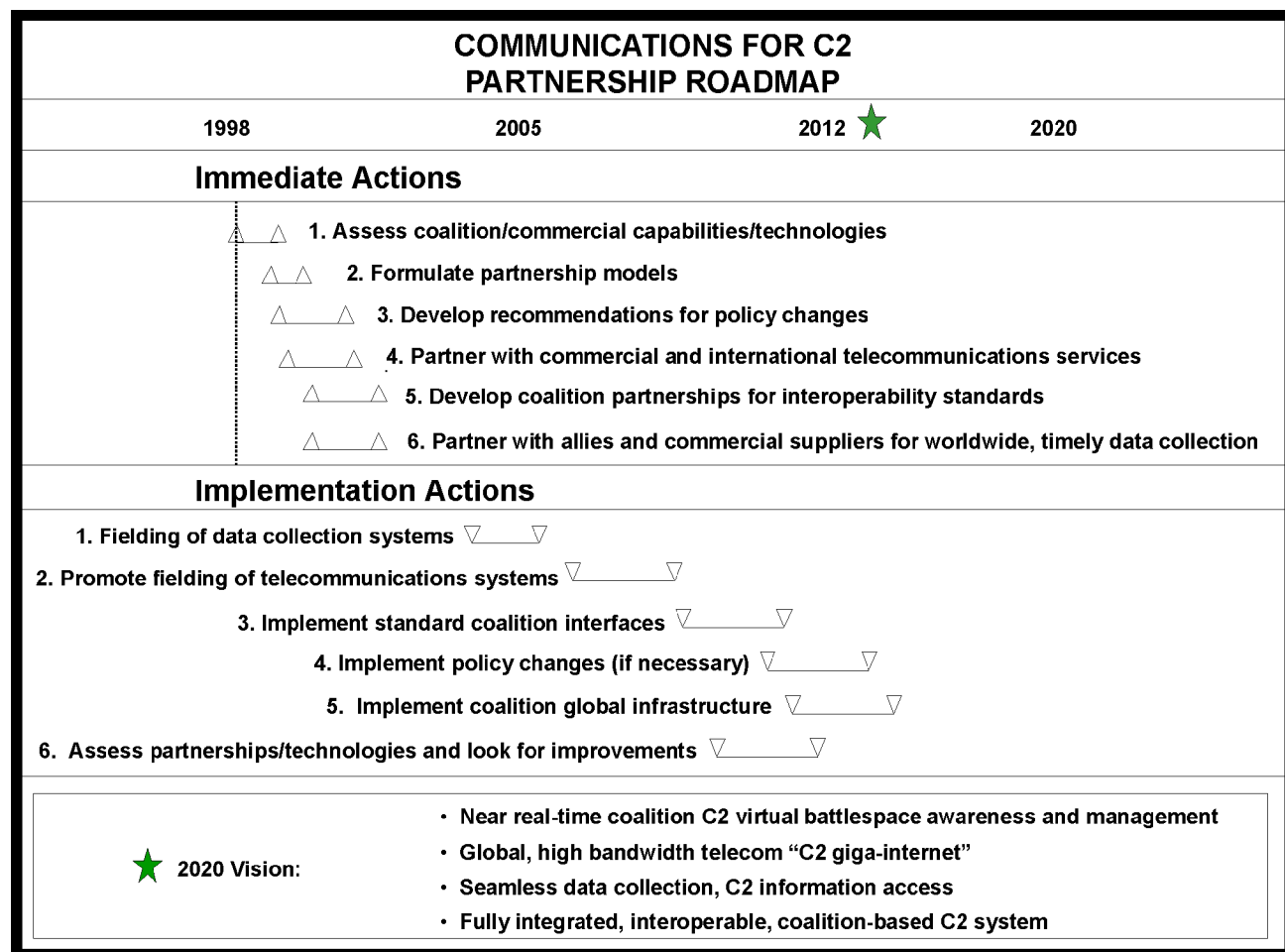


Figure 8-17 Roadmap for Partnering on Communications for Command and Control (C2)

### Information–Military Satellite Communications

Specific partnering should be sought in several key satellite communications areas. The first is in frequency protection and management. The coming explosion in commercial communications systems, both foreign and domestic, mandate close partnering among US government entities to ensure the US speaks with a common voice in international frequency management fora. DoD must ensure that frequencies critical to support military operations are available during wartime. Second, cooperative procurement, particularly of satellite terminals, offers extensive opportunities for partnerships with both industry and key Allies. Joint procurements for savings on bulk buys, common architecture elements, modular packaging to permit upgrades and insertions of new technology, and system-specific protocol cards are potential strategies to

be pursued. A third area would feature select investment in commercial systems, in conjunction with a Civil Reserve Air Fleet (CRAF)-like arrangements which would guarantee bandwidth access during times of crisis. Creative agreements, however, between DoD and commercial satellite communications providers would be necessary to consummate an effective CRAF-like system.

Key milestones in the implementation of effective partnering include discussion with allies on interoperability standards to improve future coalition capability and evaluations of policy changes necessary to allow such cooperation. These actions will ensure we have a seamless communications architecture for future military support. Figure 8-18 outlines representative steps for meeting this objective.

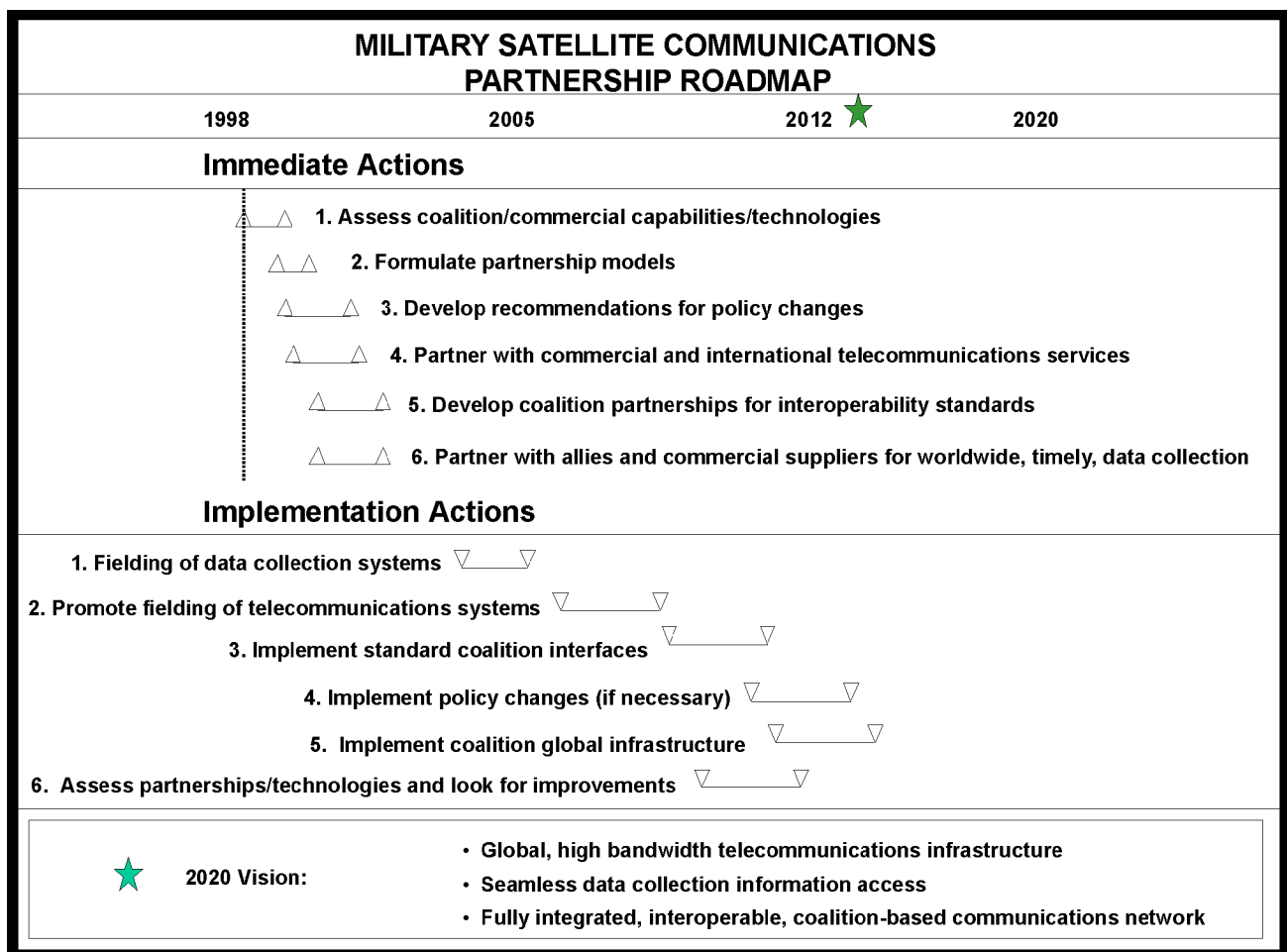


Figure 8-18 Roadmap for Partnering on Military Satellite Communications



### People-Training and Education

Despite trends toward reducing the number of people needed to operate space systems, educated people will continue to be the key to successful space power. The combat value of space must be part of every service school curriculum. International military and government students attending US service schools--tomorrow's world leaders--should be able to attend space courses (now closed due to security restrictions). In the future, we must seize this opportunity to shape the environment, induce dependencies, and enhance the solidarity of future coalitions. Taking better advantage of education with industry programs would also provide well-informed military and space decision

makers in the US. Key milestones in this effort include recognition by the military education leaders of the overwhelming leverage provided to warfighting from space. Ensuring space professionals are promoted on an equal basis with other warfighters is crucial. Finally, recognition of the opportunity provided by foreign student attendance at our schools, along with better understanding of industry's new role in military space by our emerging military leadership, will be critical to success in this area, as well.

Figure 8-19 outlines partnering steps that will develop space professionals who meet Vision 2020 goals.

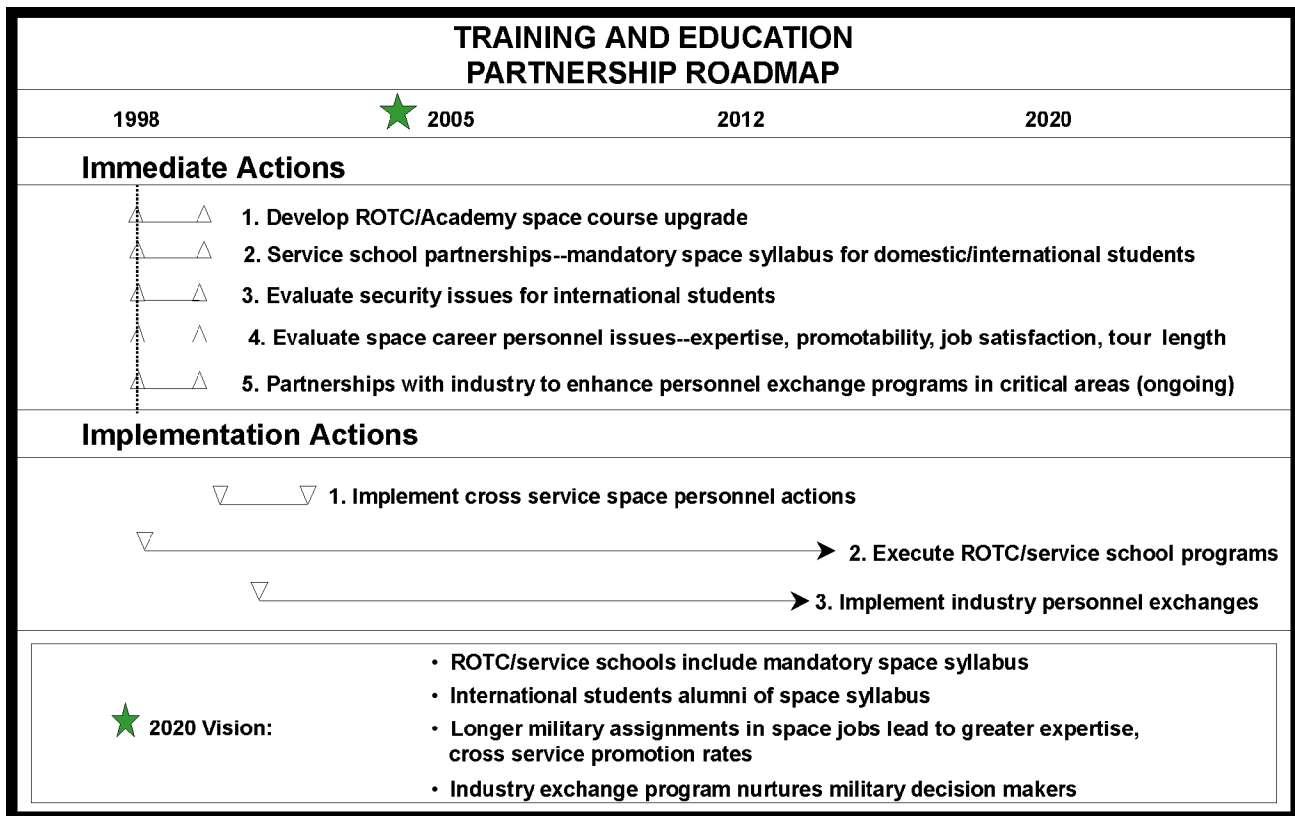


Figure 8-19 Roadmap for Partnering on Training and Education

## Partnerships for Global Engagement

As you can see in Figure 8-20, we've divided partnership opportunities for this area into two main objectives: Integrated Focused Surveillance and worldwide Missile Defense.

### Integrated Focused Surveillance

Integrated Focused Surveillance has a high potential for partnering, including imaging and related ground processing, data, and interface standards.

Operational Concept	Specified Objective	High Partnership Potential	Action Plan Timeline
GLOBAL ENGAGEMENT	Integrated Focused Surveillance	Reconnaissance and Surveillance Commercial Imagery Integration	Figure 8-21 Figure 8-22
	Missile Defense	METOC/ERM Warning	Figure 8-23 Figure 8-24

Figure 8-20 Assessing Partnership Opportunities for Global Engagement

### Reconnaissance and Surveillance

Improved partnering between the operational military and the builders and collectors of intelligence is clearly in order. Efforts will gain ground with USCINCSpace as the military's single operational focal point for space. In this role, USCINCSpace will play strongly in forming consensus/requirements for reconnaissance and surveillance systems.

Commercial space sensors also can improve reconnaissance and surveillance. These platforms should be able to enhance coverage of the electromagnetic spectrum, improve global coverage, and act as additional sources for populating the nation's imagery databases. In addition, commercial sources will be able to provide images directly to warfighters (Figure 8-21) with a goal of seamless reaction to

field requirements from sources which are transparent to the warfighter.

Partnership strategies in this arena must take into account several underlying principles. Among them is the need for a single advocate for all combatant command-level reconnaissance and surveillance needs. Strategies should pursue the dismantlement of the numerous stovepiped systems and procedures currently in existence. End-to-end systems operations should be addressed and lead to the establishment of common architectures. Finally, partnering approaches will have to balance the need to preserve US technical superiority with the advantages of sharing cost, risk, and rewards among partners.

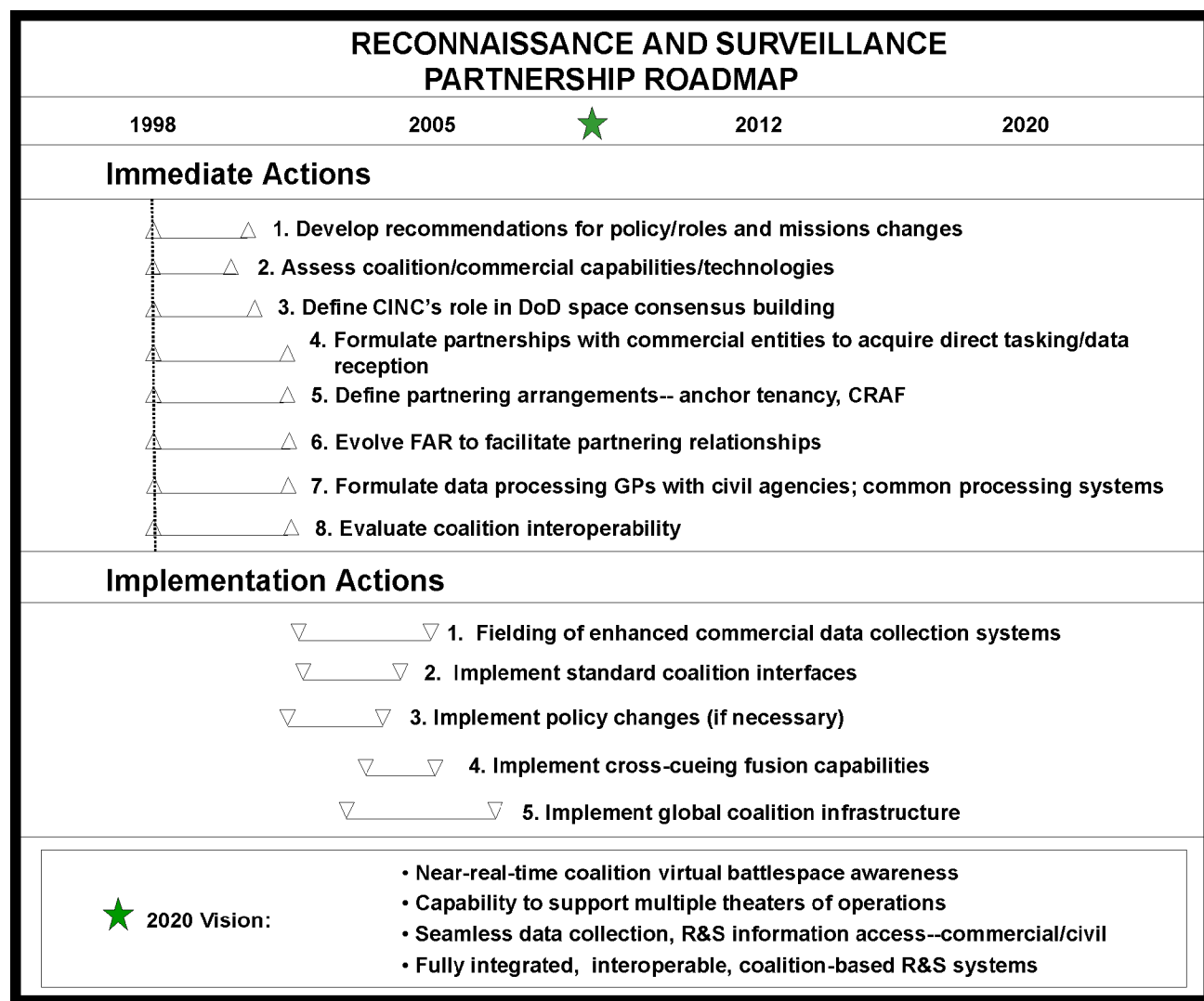


Figure 8-21 Roadmap for Partnering to do Reconnaissance and Surveillance

### Integrating Commercial Imagery

Since a number of potential partnership options with commercial data suppliers exist, most of these steps are generic in nature. Commercial imagery partnerships can be as simple as direct data procurements or may involve anchor tenancy or licenses to enable direct tasking and imagery reception from commercial systems passing over an operational area of interest to battle managers. Some potential partnership approaches include guarantees by the DoD to procure imagery from commercial vendors if the commercial vendors address DoD requirements in the development of the system.

Another approach may be to supplement payloads on commercial satellites. Direct investment in the development of a commercial system up front offers the potential to further ensure that DoD requirements are addressed in the development of that system.

Specific implementation actions will be dependent on the particular options selected. However, seamless availability of imagery to the requester will require focused leadership and critical assessment of technical impediments to the integration and distribution of data from widely diverse sources.

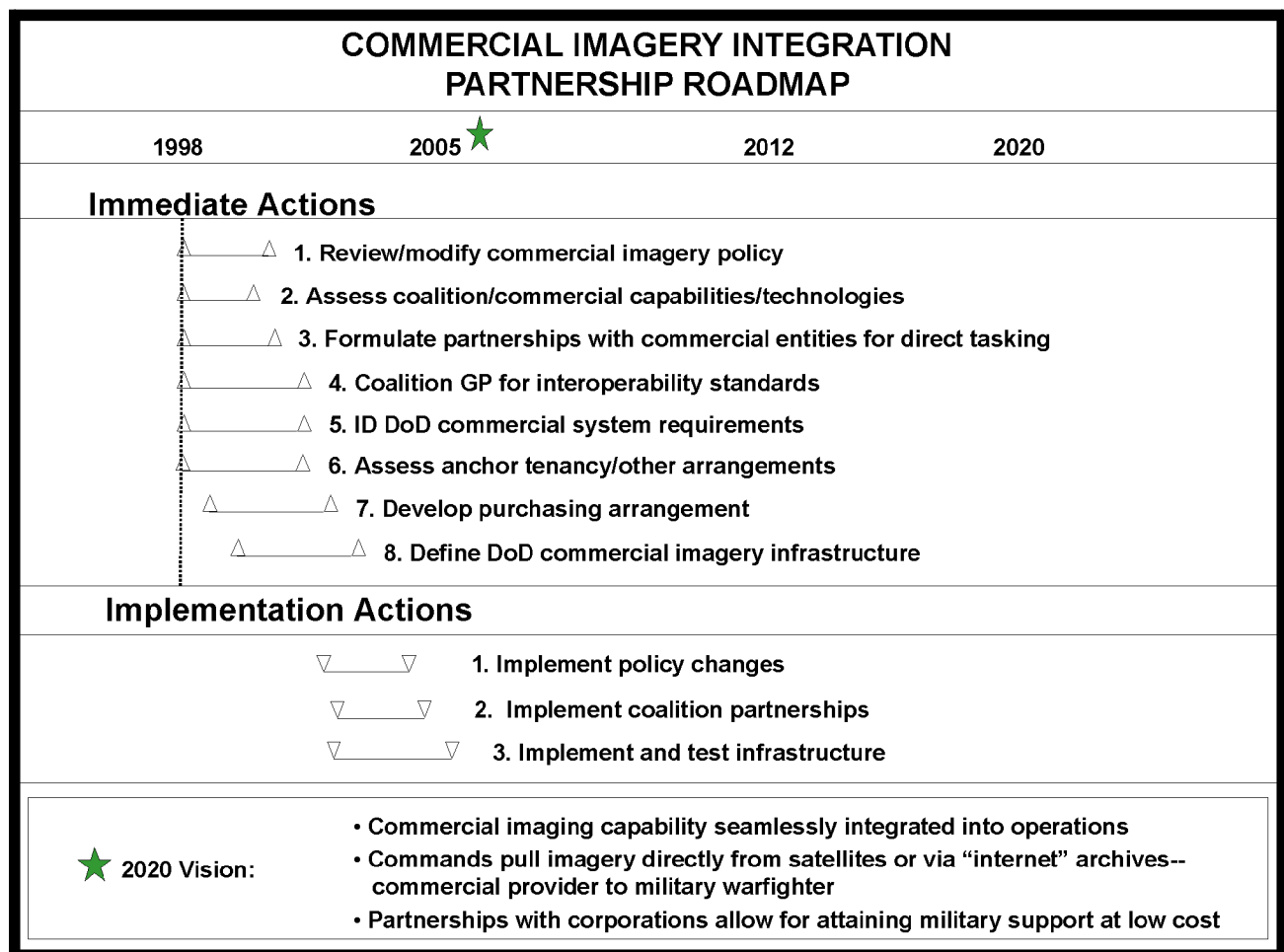


Figure 8-22 Roadmap for Partnering to Integrate Commercial Imagery with Military Systems



### Meteorological and Oceanographic/Earth Resource Monitoring (METOC/ERM)

Partnerships can strongly supplement warfighting capabilities in this area. The National Polar Orbiting Environmental Satellite Program is a template for transitioning DoD infrastructure which, if perfected, could allow additional cooperation in warning, command and control, reconnaissance and surveillance, and other related areas. Commercial capabilities to monitor the earth's resources, if integrated into military operations, can add much to sensors that focus on satisfying national requirements. Seamlessly integrated commercial images could give warfighters more information in near real time.

Among the requirements for safe operations in space is the ability to monitor, predict and evaluate the environmental conditions in space. With the large-scale environmental disturbances expected as a result of Solar Max at the turn of the century,

projects such as DoD's Compact Environment Anomaly Sensor (CEASE)—a small environmental sensor placed on other than meteorological satellites—and a solar wind monitor proposed in the National Environmental Monitoring Satellite System (NEMSS) are piquing the interest of international space agencies and commercial satellite operators. Agreements to include CEASE-like sensors on all next generation satellites would significantly increase the environmental database. Sensor costs could be spread across the US military, civil, commercial, and foreign sectors with the resultant raw data being made available to all participants. DoD should be an active participant in building consensus among domestic and international with the specific aim of increasing the fidelity of the characterization of the space environment

Figure 8-23 shows a path towards reaching goals in this area.

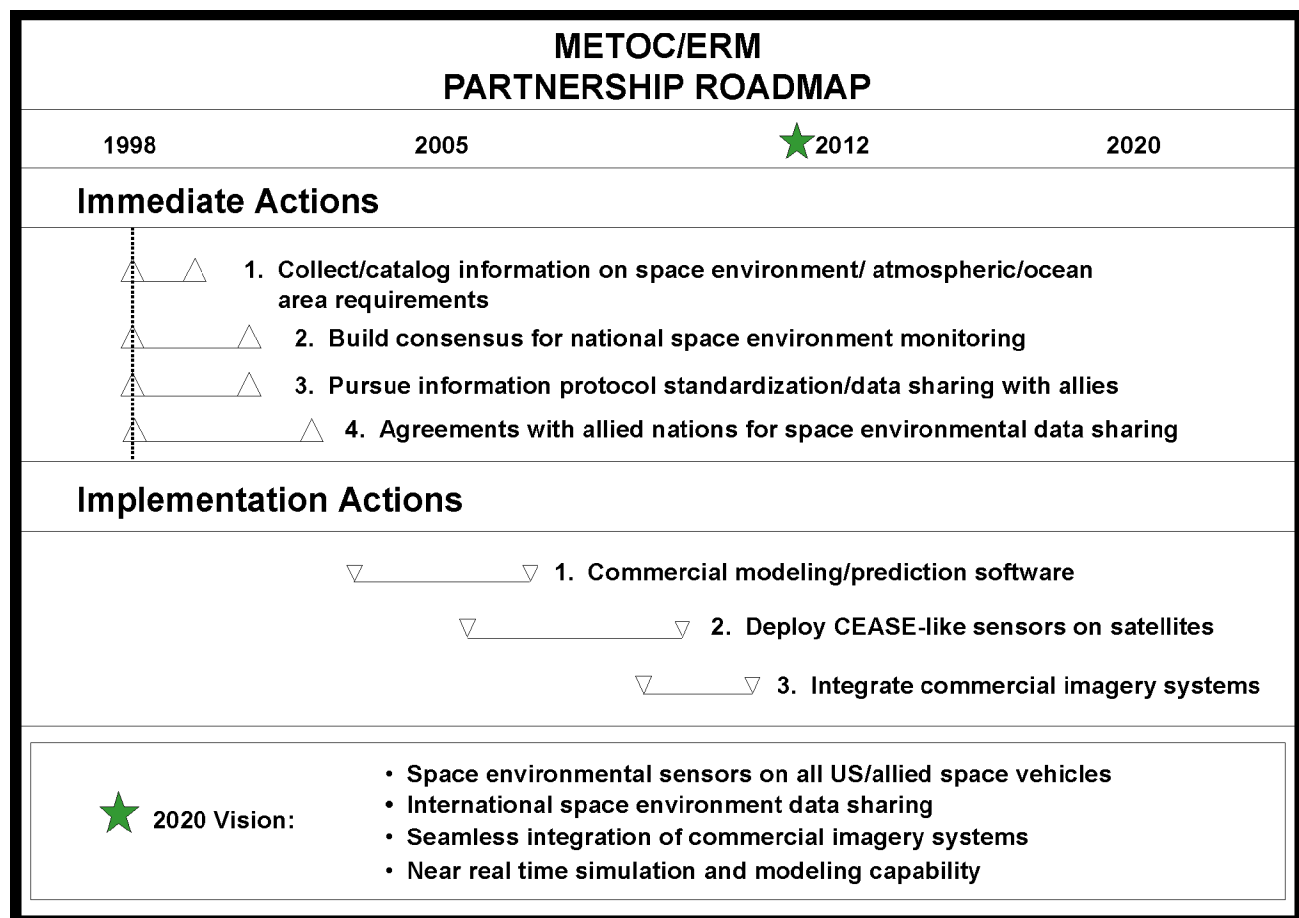


Figure 8-23 Roadmap for Partnering to Improve METOC/ERM

### Missile Defense Warning

Warning offers strong partnering opportunities because most of the world's developed countries share this goal. As threats spread globally and more countries find themselves at risk, partnering potential will increase. Certain aspects of warning are core military functions—preparing for launch, assessing payloads, summarizing intelligence on threats, etc. But close military allies could share some tasks and improve early warning for better deterrence. Widespread sharing of warning information should create dependencies which may impede aggression.

Accomplishment of the immediate actions detailed in Figure 8-24 will likely point toward several partnering options. First, the US could provide warning data to partner countries in exchange for shared costs of developing, procuring, launching and maintaining a global sensor network. Emphasis would be placed on detection and warning,

not sources and methodology, and the US would still be the primary source of warning data. The second option would feature a multinational warning network, either integrated or redundant, with free information exchange among partners. Under this arrangement, more countries would be originators of warning information. A third option would explore phenomenology data sharing (e.g. infrared and radar signature models) among partner nations. This option would save a degree of US analytical research funds. Characteristic of the fourth option would be joint R&D programs between US and foreign civilian and military organizations.

Of course, all such sharing concepts should consider the risks created by implicit knowledge of warning characteristics. This risk, however, must be weighed against the partnering benefits and the probable reduction in tension provided by a worldwide warning network.

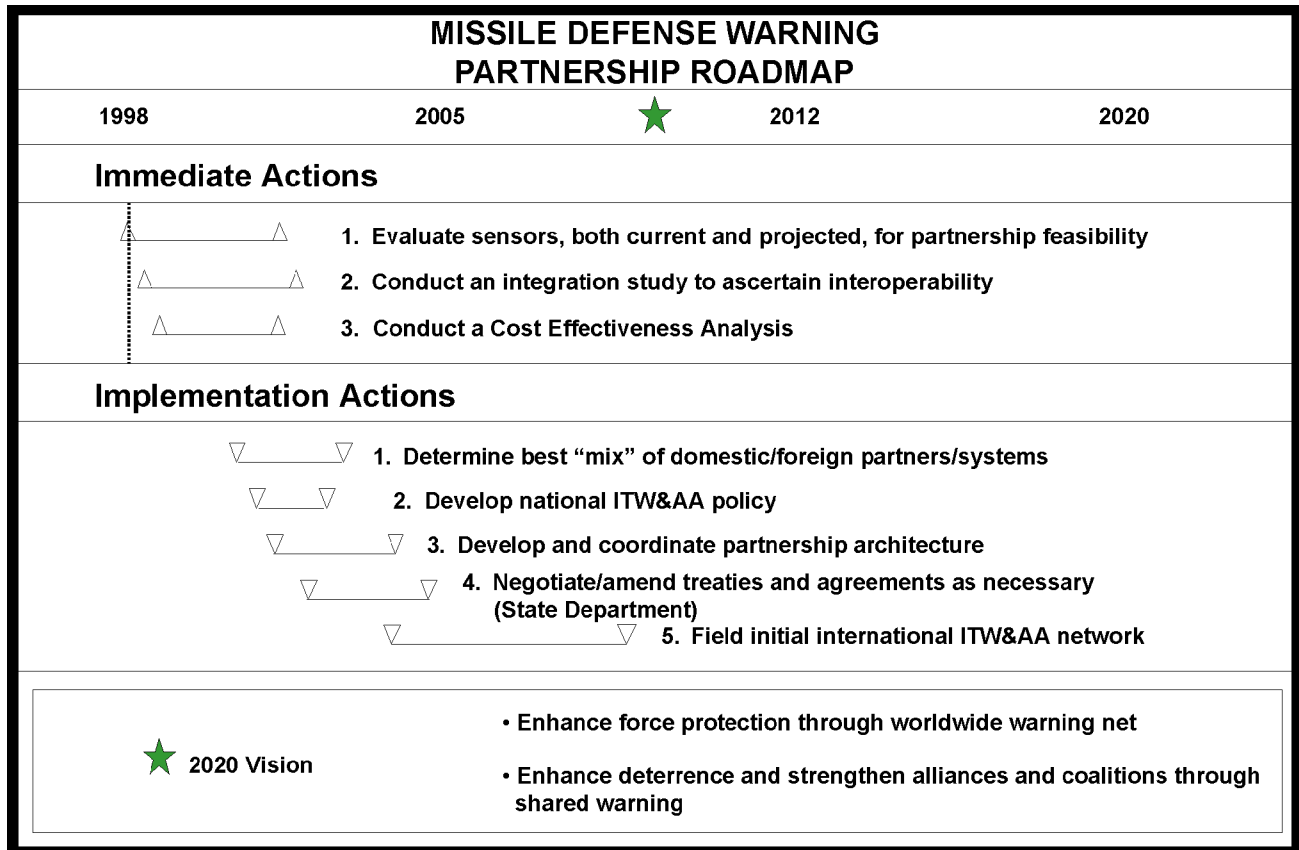


Figure 8-24 Roadmap on Partnerships for Missile Defense Warning

# ASSESSING PRIORITIES FOR GLOBAL PARTNERSHIPS

Priority assessments for Global Partnerships outline each operational concept's critical capabilities and thrusts, and their partnership potential. The roadmaps we've presented throughout this section have shown how to partner successfully for each capability with a "High" or "Medium-High" potential for partnership (See Figure 8-25).

"Victory smiles upon those who anticipate the changes in the character of war and not those who wait to adapt themselves after the changes occur."

*Giulio Douhet*

Figure 8-25 relates each of the Operational Concept Integrator's critical capabilities to Global Partnership roadmaps.

## MAKING GLOBAL PARTNERSHIPS REAL

While partnering presents many chances to meet mission requirements through 2020, impediments may limit its potency. Overall, global partnering has three challenges: limited resources, profit motivation of corporations, and allies' national interests which may diverge from ours.

Surmounting such obstacles will challenge many people for a long time. USCINCSpace must keep an institutional commitment and focus on partnering through close contact with involved stakeholders, calculated risk-taking developers, the right organization to carry it out, and top-down direction whenever necessary.

The key to making Global Partnerships endure is to create a GP Execution Group (GPX). This Group would consist of personnel from active duty, reserve, civil service, and contractor organizations—with backgrounds in space system acquisition,

operations, civilian and commercial development, and international affairs. Personnel from USSPACECOM who are now partnering in the international, civil, and commercial areas could be the initial cadre. National-level liaison may also want to participate. Because staffing billets are a critical issue, outsourcing part of the effort makes good sense, as does selectively employing reservists with expertise in business, industry, and international affairs. Beyond the core cadre, the group could use other specialists for a short time to solve certain issues. Allies may also be able to contribute personnel.

The GPX would focus on partnering and externally orient themselves to relate with commercial, civil and international players. Internally, the GPX would report directly to USCINCSpace (or the Deputy CINC) with appropriate direct access and would internally clear and coordinate all initiatives for Global Partnerships. The GPX would jump-start or be a catalyst for immediate action on partnering that requires quick action, is highly visible, and has a strong effect on capability development. At the same time, the GPX would be trying to institutionalize key processes and build on early successes to develop momentum. The idea of an 18 to 24-month sunset clause for the GPX has merit.

## ACHIEVING EARLY SUCCESS IN PARTNERING

Although Global Partnerships aren't a panacea for operating within a resource-constrained environment, it is an integrated approach to maintaining US space superiority well into the 21st Century. Global partnering represents a basic shift in traditional thinking about achieving warfighting capabilities for space.

Several initiatives offer a chance for early success in partnerships. First, as noted above, we need a special group within USSPACECOM to kick-start partnering. Second, we must expand professional-education programs to rapidly develop the military professional's knowledge of space. Finally, we must seek commercial partners to develop the SSN, space-launch operations, and command and

control operations on the ground—three areas where partnering can save a lot of money now and later. Opportunities for “immediate success” are:

- Establish a USSPACECOM organization dedicated to exploitation of partnership opportunities
- Develop (with the help of education and training activities within the services) training programs aimed at enhancing space professional development
- Develop commercialization opportunities in:
  - ◆ Space surveillance
  - ◆ Space launch
  - ◆ Ground command and control supporting space operations
  - ◆ Space design standards

Operational Concept	Critical Capability	Partnership Potential	GP Support
Control of Space	Real Time Characterization of high interest objects (HIOs)	High	Real-time Characterization of HIOs Commercialization of SSN Services Internationalization of SSN Services
	Detect & Report Threat/Attack	Medium	Protect/Attack Verification
	Detect Space Systems Use	Medium	Prevent Attack Verification
	Recoverable Rapid Transport to/through/from Space	High	Launch on Demand/Rapid Response
	Flexible Effects	Low	No Specific Roadmap Developed
	Battle Manager (Space)	Low	No Specific Roadmap Developed
	Global Traffic Control	High	Commercial Spaceports
Full Force Integration	Education and Training	High	Personnel
	Policy and Doctrine	High	See Policy Section
	Exercises	High	No Specific Roadmap Developed
	Battle Managers	Low	C2 Support Systems and Communications for C2
	Modeling and Simulation of Space Capabilities	High	No Specific Roadmap Developed
	Command and Control of Space Forces	High	C2 Support Systems and Communications for C2
Global Engagement	Generate/Disseminate Warning Information	Medium - High	Warning
	Information Fusion	Medium - High	C2 Support Systems and Communications for C2
	R&S Detection and Coverage; Situation Awareness	High	Commercial Imagery Integration
	METOC/ERM Worldwide Coverage and ERM Refresh Rate	High	METOC/ERM
	Real Time Target Identification and Characterization	High	Commercial Imagery Integration
	Ballistic and Cruise Missile Warning (2020 Global Coverage)	Medium - High	C2 Support Systems
	On-Demand Missile Defense (Global, Minutes)	Medium	Warning; C2 Support Systems and Communications for C2
	Full Spectrum Engagement	Medium - High	All Roadmaps Apply
Global Partnerships	Generic Applicability	High	Shaping the Environment
	Generic Applicability	High	Policies

Figure 8-25 Global Partnerships Priority Assessments



